

*Agerton & ex dono D. Valentyni Crewe.*

THE  
Historie of Man, sucked  
from the sappe of the most approued  
Anathomistes, in this present age, compiled  
in most compendious forme, and now published in  
English, for the vtilitie of all godly Chirurgians,  
within this Realme, by *Iohn Banister*, Master  
in Chirurgerie, and Practitioner  
in Phisicke.



Ter. And.

*Si illum obiuiges, vite qui auxilium tulit,  
Quid facias illi, qui dederit damnum, aut malum?*

If that for him that aydes thy lyfe, thou chidynges vp doest lay?  
What canst thou do to him that hurtes, or seeketh thy decay?



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# TO THE RIGHT WORSHIP

full, Syr Frauncis Willoughby, Knight, Iohn Banister, your most bounden, wilheth the dayly encrease of vertuous knowledge, and happy health, both here, and euerlastyngly.



Like as the earth was not made to lye waste, and voyde, as a rude congested heape, but to bring forth copious store, and that in sundry sortes, of creatures, corne, and frutes: neither these, as to glory in the riches of her owne proper nature, ordained, but for the speciall behoofe, vse, and vilitie of mankind: euen so (right worshipfull) is man for mā, and all things for the cause of others, engendred. Nothing hath a peculiar life. Nothing ioyleth without societie of other.

Wherefore there ought to be one purpose, and inclination in all men, that alike vilitie, and of all things, may be to euery one. Which if any man do snatch vnto him selfe, all humane fellowship is dissolued.

Cic. off. lib. 3.

And if nature do prescribe this, that one man should assist, and take care of another, if it be but onely for the cause that he is a man, it is necessarie, according to the same nature, that the vilitie of all things be common. For no man, of wit, or understanding (saith Demosthenes) will suppose himselfe to be borne onely to his father, and mother, but also to his countrey. Why, what is betwene? Euen this, that he, who supposeth himselfe onely to be borne to his parentes, expecteth a fatal and naturall death: but he, that acknowledgeth his birth to his countrey, rather, then he will see the same in seruitude, shall willingly put him selfe into the bandes of death. Which caused that valiaunt young Romane Curtius to prostrate him selfe, headlong, into the insatiable gulphe of the earth, which sodainly had opened in the market place, that (I say) he might free, and (as it were) ransome the whole Citie from the terrour of that monster. With no lesse pietie haue some abandoned themselves, lest, by their own prosperitie, the state of the commons might be impaired. As Genutius Cipus, being Pretor, and walking forth of one of the gates of Rome, their stragg forth of his head y. hornes, vpon a soaaine, and answer being giuen, that, if he would returne into the Citie, he should be king: he, that it might not come to passe, forthwith freely commaunded him selfe into perpetuall exile. If then it be so, that a solid common wealth is most prosperous, and that is a solid common wealth, whereof the faithfull inhabitantes beare themselves as the true members of it, their naturall body of duetie ought we that are the partes, to vse, inuent, and communicate that (eche one according to the portion of his talent) amongest our selues, which may procrastinate the continuance of the healthfull state of our body, that is, the common wealth.

Demosthenes, Orat. de. Cor.

Titus Liv. M. Curtius.

Val. Max. li. 5. ca. 6. Genutius Cipus.

And he that endeuoreth nothing to further it, is unnaturall, like as he that bindeth the same, is, as a rotten member, worthy to be cut away. To this saith the Poete, commending vnto vs the maners of Cato, that is,

Iucan lib. 2. de Catoe.

A.ij.

seruare

## Epistle Dedicatory.

servare modum, finemq; tenere,  
Naturamq; sequi, patriaq; impendere vitam,  
Nec sibi, sed toti genitum se credere mundo.

Cicero off. lib. 7.

Also that deuine Cicero saith, that, to take away any thing from an other, or one man to encrease his owne profite, by the discommoditie of an other, is more contrary to nature, then death, then pouertie, then payne, or then whatsoeuer may chaunce to our body, or outward things. For if so we be affected, that euery one may catch vnto him selfe, and hide from others, there is loue broken, then is humane societie buried. It is more laudable therefore, and according to nature (sayth Cicero) to take vpon vs the greatest labour, and molestatio, for the conseruation and helping (if it may be) of all nations, imitating that same Hercules (whom fame, mindfull of all benefites, hath canonized, or as it were made a God) then to liue in all securitie: not onely without any griefes, but abounding also in all pleasures, and riches, beautie, and strength.

Which, so sacred a sayeng (right worshipfull) hath made me, quite forgetting my impotencie, willingly to put on armour also against ignorance, and boldly to march towards the castle of Arte, there to offer my seruice to science, the generall. Of one thing being sure, that the armour, which I carie, is most precious and costly. Wherefore, I shall humbly craue at his handes, that I may, not as an enemy, be receiued into his gates: and the, if he shall esteeme me unworthie, or vnable to carie so costlie and waightie armour, I shall (right gladly) yeld the same, to the vse of some of his valiaunt Captaines: to whom my good will, now shewed by endenour, is nothing inferiour.

Which good will in deede, is all that I am hable to shewe, and that taken away, my burden might easely presse me to the ground: for considering so ripe a world, such plenty of Artes, such profound wittes, such learned cares, and, there withall, such Tigrish whelpes of Momus pampering, if feare should haue surprisid my senses, and there withall (if it had bene possible) vanquished my Zeale, to the utter ruine of these my labours, the wise would not haue meruailed at all. Good will therfore may, of right, be called the butwarke of the commo wealth. For what thing is so hard, that good will maketh not easie? what is so highe, that good will may not reach? what is so worthy, that good will shall not winne? It is loue, it is truth, it is the author of all artes, and the key of all treasure saith Demosthenes. In fine, there is nothing so highe in the heauens aboue, nothing so low in the earth beneath, nothing so profound in the bowels of Arte, nor any thing so hid in the secretes of nature, as that good will dare not enterprise, search, vnclose, or discover.

And this benefite I am assured my beneuolence shall purchase, that either, be it, others shalbe moued, to fall, and fashion these my rough forged labours, or els, accented with the like pietie, and the rather by example hereof, which shall moue them (as it were) to emulation, to builde a new worke out of the ground, that may, in all thinges, perfourme that, whiche here I haue wished to haue bene fulfilled. Of both which, whether soeuer shali come to passe, my desire shalbe satisfied.

And, howsoeuer it be, I hope the godly mynded will rather prayse my beneuolence the discourage my want at all. As for those of Marius sect, which euer scorne the noble courage of Curtius: such Syllacs, as alway deride the rare vertue of Ge-

nutius:

Val. Max. li. 5. ca. 6.  
Marius, Curtius,  
Sylla, Genutius.

## Epistle Dedicatory.

nutius: and such Cinnaes, as perpetually laugh at the meruailous pietie of Aelins, what should I force at all? nay, I am farre fro taking care for their endles malice, as that it shall greatly ioy me, if my vertue may shorten their lines. To the which (I hope) all the souldiers of science will hold vp their handes. For although it be so, as the Poete saith,

Invidia vexantur opes: namq; optima livor  
Quaq; malus ladens, odit foelicia semper.

Pal. lib. 2.

Yet vertue is a sufficient spurre vnto vs: and well it is sayd,

Verum age nate tuos ortus, nec bella pavescas  
Villa, nec in coelum dubites te tollere factis.

Wh. Ital. lib. 13.

There is one thing also, which ought to be a great comfort vnto the godly minded, that is, that none do persecute vertuous procedynges, saue onely the enemies of vertue. And enuy (saith Cicero) of force will accompany vertue. Wherefore, letting such go as retaine onely the figure of man, since Adversus invidiam nihil prodest vera dicere, & especially time present cannot say well, as Martial saith.

Esse quid hoc dicam, vivis quod fama negatur,  
Et sua quod rarus tempora lector amat?  
Hi sunt invidia nimirum, Regule, mores,  
Præferat antiquos semper ut illa nobis.

Lib. 5.

Whereto also Ouid.

Pascitur in vivis livor, post fata quiescit:  
Tunc suus ex merito quemq; tuetur honos.

Lib. 1. Elig.

He that intendeth in deede to beare the name of a man, must first consider his birth, and secondly his calling. For as the horse to runne, the Ox to plough, and the dogge to hunte: euen so man (saith Aristotle) is borne to two thinges, that is, to vnderstand, & to do, or endenour: as who should say, we are not borne onely to haue vnderstanding, but also to put it in vse. For els in deede we shall know nothing, but liue in filth by ignorance: that the song of the Poete might be verified, who saith,

Deniq; nil sciri quis putat, id quoq; nescit  
An sciri possit, quo nil se scire fatetur.

Lucretius lib. 4. d. 4  
nat. Rerum.

Then which abhominable crime, what to be more vnseemely in a man, cannot be declared or thought. But he that detesteth that, and entrench in vnto the vnderstanding of him selfe, accordingly also employing his time, his calling shalbe to a higher steppe: which likewise shalbe required of him. For therefore sayth the renowned Athenian Oratour, By how much thou hast a more excellent nature, by so much thou expectest greater dignities, and so much the rather, I iudge, thou wilt make triall of thy selfe. And surely Cicero supposeth it cannot be in a man to hid his vertue in him selfe. Which moued him to say, we are driuen to it of nature, to desire to profite many, especially in teaching, and reuealing the reasons of wisdom. Therefore it is not easie to finde such a one, as will not be content to teach that vnto an other, which he knoweth him selfe. So that we are not onely inclined to learne, but to teach also. And truth it is in deede, for what pietie is in him, that seeth another

Demosth. ex. or. 1.  
ama.

2. de. Finib.

A. ij.

out

## Epistle Dedicatory.

out of his way, and will not shew him of it? or what humanitie hath he that earnestly wseth his tyme, in gathering together the goodes of vertue, and at length, in one instant, causeth them to perish with his body?

*Demosth. Olinth. 2.*

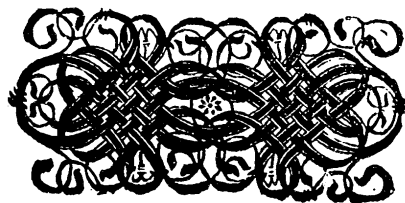
As therefore (saith Demosthenes) he is accounted great and mighty, whom everyone do iudge to make eche thing profitable to him: eue so, by the same thinges he shall be reiected, when he is conuicted to haue done all for the cause of his owne utilitie. Which thinges considered, I shall not neede to render account of my enterprise, neither (I hope) to craue the furtheraunce of the godly learned. For although, to discusse the secretes of nature, which are so meruailous in mans body, it is the hardest point in Philosophie, yet is not the difficultie therof such, as ought wholly to terrifie vs from the searche therof: nay, rather it ought to spurre vs forward, to use more serious diligence therein. Since the payne is not halfe so great, that is taken in the winning therof, as the utilitie rewardeth of that which is obtained.

*Darius.*

And albeit this is so worthy a matter, as needeth no authours commendation, and therefore should worthely merite the labour of the learned: yet as Darius denounced that to be the sweetest draught that euer he dronke, which, in his wearie flight, he had drawne from a filthy standing puddle, because, it seemeth before, he had neuer drunke thirstie: euen so, I hope, my labour shall be thankfully taken, of all honest Chirurgians, considering the barren draught, that Chirurgerie, throughout the Realme of England, in this present age, endureth: and which can neuer be quenched, by the fruitfull water that floweth from the fountaines of Anathomie. Of which, I haue now endenoured to turne one cocke. Which faithfully beyng done, according to my might, such as it is, I offer, before all others vnto you right worshipfull, and my most bounden, beseeching you, to accept the dedication of these my rude labours: which, were they as worthy as Galens, you might of due tie challenge. Notwithstandyng, what soeuer they are, good will is full in them. And that is the rest of my hope, and that is it, which your worship neuer denied. Which cherishing me, I am bold to publish this History of Man, vnder your name, to the benefite of my Christian brethren, the godlie, and toward Chirurgians of England.

Wherupon also if your worship, sometime in Ciceroes ocium (whereto you are much addicted) shall chaunce to looke, no doubt, but you shall take great delight in the matter therof. Which, now also, of force, comitting to the sundry iudgements of infinite opinions, I cease, beseechyng vnto your worship, and all that godly shall use me, the sweete encrease of all flourishing vertues: and vnto the rest, the obtaining of a better mynde in Christ Iesu.

Your worth. in all I may,  
John Banister.



## TO THE WORSHIPFULL THE

Maister, Wardens, Afsistantes, and fellowly Fraternitie  
of Chirurgians in London: and from them to all godly, true  
and zealous professors of Medicine, throughout this Realme  
of England, John Banister wisheth the testimonie of a  
cleare conscience, before the highest Auditor.



After the publication of my vnpolished Booke of vlcers (most graue Patrons) withdrawing my selfe into my naked study, and deuising how best to performe my promise therein, but first considering, and in deede more deeply waying (according to the state of tyme, and present want) whiche way I might most of all seeke the aduancemēt of Chirurgerie in England, in the which cogitatio (I confesse) my zeale hath long tyme turned: At last I called to remembrance, that the greatest want that raigueth in Chirurgians at this day, is ignorance in the subiect of their worke, waying also on the other side, that no English Authour, which hitherto hath written, hath sufficiently applyed his tyme to the amendement therof. Then was I wholly ouercome in this purpose, and then did I clearely see, how that to write Methodes or meanes to cure the affected partes of the body, the partes them selues beyng altogether vnknewen, or falsely imagined of, might rather be a meane to indurate the cataract of inscience, then to eate it through, or take it away. So thus I decreed to chaunge my purpose, that is, in steede of the Booke of Tumours, which I had before promised, to compile some worke of Anathomie, whiche might occupie sufficient scope to entreate of all the partes of man.

But as the wanton child, that cryeth oft to handle that thyng which his strength is not able to meddle, but rather to endamage or hurt him selfe: Euen so did I full litle vnderstand the waight of my burden, till I had it on my Caluissus shoulders: when as it immediately had dissolued my good enterprise, had not then the flames of zeale accended the courage of Hercules in my brest. By meanes whereof although the same be now finished, yet so, as I determine nothyng lesse then hereby to hinder the proceeding of others in the lyke cause, nay rather I am resoluēd, that hereby I shall instigate and set forward the endeuours of such as are equally mynded, to the aduancement of the famous Arte Chirurgerie. For, as to the building of some riche tower, or strong castle, beside the deuilsours of the woork and free Adasons, there are required

*Caluissus Sabius.*

*Hercules.*



## The Epistle to the Chirurgians.

sondy inferiour Officers and labouryng persons, neither all to one ende, vse, or office, but some to digge, some to square stones, some to carie them to woorkemen, &c: Euen so I, not hauyng the knowledge to deuise, nor the pollicie to digge for the best stone, neither the skill to temper the morter, nor yet the reason rightly to square the stone, notwithstanding because my zeale is nothyng inferiour to the chiefe Masons, haue had the will to gather the stones, and lay them by the woorkemen, now also hoppyng that some cunnyng Mason will reache his hand to my heape, and lay of the stones of my gatheryng to the buildyng of this famous tower of health: since I shall conceiue incredible felicitie, if I may hereafter, in viewyng this renowned buildyng (for so I hope surely to see it) cast myne eye vpon those stones whiche my homely handes had so rudely congested, and see them cunnyngly wrought, and aptly applyed to the buildyng.

Into which consideration of me I first beseech you (most graue Seniors and Christian brethren) to enter, before you take any occasion to accuse me of temeritie, whiche crime I had worthely incurred if zeale should not mediate my cause, so do I hope, that you will not onely fauour the frutes of my labours, and adde to them your helypyng handes, but also be (in my behalfe) the shield of Pallas, agaynst such Serpentine tounges as duely seeke to prophane of all godly endeours.

But to returne to my first determinatiō, whē I had wholly giuē my consent to this end, I might see first a farre of, what sondy & great mutatiōs nature hath vsed in y body of mā since Galen wrote in Anathomy: and omitting diuers old writers, whose workes had not all equall successe, I came at length to Vesalius, whose whole worke seemed as tedious as his Epitome ouerculled & short. But whē I saw Fuchsius to haue extract a notable Epitome out of Vesalius & Galen, I had thought to looke no further till Collumbus appeared in my sight: whose labours then reuoluyng, and seyng him in some thynges vse sufficient prolirite, as in his Bookes of Bones and Muscles, & in other causes to be somewhat brief (because Vesalius had sufficiently handled them) as in the nutritiue partes, immediately I refused to bynde my selfe to any peculiar translation, chusing rather to picke a posie of the chiefest flowers frō all their Gardens, the opinion of Fernelius and others not beyng utterly refused, as throughout the History is diligently noted.

And so much the rather I esteemed this the best, because that way I perceiued I might both more playnly describe the partes to the iudgement of the Reader, as also vse sufficient scope vpon the dissention of Authours in the most notable causes. These considerations vsed, I set forward in this matter, purposing (to speake briefly) to penne it in fourme of a History, least the Volume of the booke

## The Epistle to the Chirurgians.

booke should ouer hastily encrease, whereby I might be inhibited to vse requisite prolirite in conuenient causes.

And now finally beyng finished, as I may, not as I would, I (the least of the number) do offer the first frutes thereof vnto you, the auncient fraternitie of Chirurgians in London, and consequently from you, to all Godly, and single professours of the Arte of Chirurgerie, throughout this Realme of England: into whose myndes, I beseech God to inspire the grace of his holy spirite, that we may all (yet at length) with one consent together, endeavour, study, searche, knocke, and call at the gate of Gods mercy, for the guidyng of his holy spirite, that, in all our proceedynges, beyng thereby protected, we may seeke the aduancement of the glory of God, in healpyng our afflicted brethren, whereto his diuine power shall (so oft as it pleaseth him) liboꝛne, and appoynt vs Ministers, that (I say) with the testimonie of a cleare conscience, we may render our vaunted talents vnto the high Auditour, in the day of cunnyng, which, we know not how neare, approacheth.

As for you, O ye chaffe of the earth, ye stinge of the Godly, ye Impes of Hell, and children of wrath, you (I say) that, vnder pretence of the sacred Arte of Medicine, deuoure the sheepe of Gods pasture, flea the laboures in his Haruest, and denye your Lord the frutes of the Vineyard: since no warnynges may admonishe you, no exhortation amende you, no lawes brydle you, no punishmentes tame you, nor any feare of God sinke into your brestes: behold, all the true professours of Christ Iesus, and who carefully endeavour Godly to discharge their functions, do cry for vengeance from heauen vpon you. And I (in these my labours) from the depth of my hart renounce you, hoppyng assuredly, that from none of the flowers of this Garden any of you shall take oportunitie to sucke that, whiche may maintaine the infection of your pestilent wretchednesse hereafter. If therefore I haue any where frequented a phrase aboue the common vse of our English language, or vsed woordes litle different from the Latin, esteeme the same to be done onely for your cause, since (as much as in me lyeth) I haue endeouored euery where, to shade the kernell with a harder shell then you shalbe able to cracke. Away therefore you Wipers. Let these my simple labours, what soeuer they are, be entertained in the handes of the true, vertuous, and honest Artistes, and professours of Chirurgerie, that my expectation may be fulfilled, Arte rightly aduanced, and God duely worshipped.

And now returnyng to you agayne (most Godly gouernours, for whose sakes I was most encouraged to perseuer in this enterprise) consideryng your Godly affection towardes me heretofore, and that it hath euer pleased you to esteeme of me, farre more, then the bittermost of my power, at any tyme, may merite, I thought

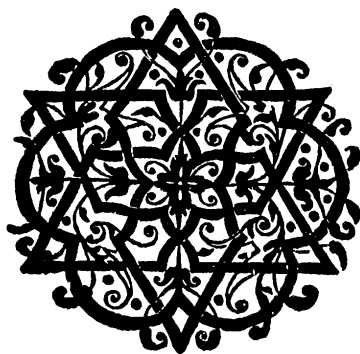
## The Epistle to the Chirurgians.

It not onely the office of pietie, by this meanes, to pricke foreward the myndes of some of the learned sort, but also to commit this vnto you, as a pledge of my vnferned zeale to the Arte of Chirurgerie, and consequently to you the chief pillours thereof in this Realme: which, beyng thankefully receiued of your gratefull hartes, may testifie for me, that inwardly I wishe, whiche outwardly I am not able to manifest.

Haue now therfore this History of Man, picked from the plenty of the most noble Anathomistes aboue named, wherein I haue earnestly, though rudely, endeuoured to set wyde open the closet doore of natures secretes, whereinto euery Godly Artist may safely enter, to see clearly all the partes, and notable deuises of nature in the body of man. From the female, and that (as I suppose) for sundry good considerations, I haue wholly abstained my pene: least, shunning Charibdis, I should fall into Scylla headlong. No more, but vouchsafe to accept Sinætes faythfull offer, and protect this handfull of water, from the pollution of straunge beastes.

Farewell from Nottingham.

Tyme



## THE PROEME.



Iyme, the generall rust of the world, which weareth, eateth, consumeth, and perforateth all thynges, hath denied that the preceptes of the deuine parentes and progenitours of Physicke, should for euermore remaine insoluble, or free from all future chaunge: els what should withstand, whereby the workes of Hipocrates and Galene should not suffice all posterities that come after? For what thyng notable haue they not noted? what secret so daintie, that they haue not vncovered: yea what misterie so couert, the doore wherof they haue not opened? And yet notwithstanding, these deuine Oracles haue not taken from posteritie all occasion to write, neither shall the bookes which hitherto are written, do the like to those that come after. But ech age hath his tyme, eche nation his nature, and ech nature his property.

Albeit, this excellencie we ascribe to Hipocrates and Galen, that neuer any hath bene their equals, and that from their fountaines flow the springyng streames, that nourishe Physicke for euer. So that what good thing soeuer we haue, or atcheiue, we are to consecrate the same vnto their honor and prayse: and what worke soeuer is published, if the same be worth the reading, we owe it wholly vnto them. What the (you will say) is the cause, that their workes suffer in these dayes such sundry contradictions, especially in the partes of mans body? It is answered a litle before, how that tyme, natures, and nations must be respected.

For first, that the magnitude of our body is greatly diminished, it is a thing in readynes to euery man, not onely by the authoritie of auncient writers, but also that dayly, and (as I suppose) throughout the world, the stature of mā in all pointes decreaseth: especially in those regions: where as matrimonie is ouer liberally, & before the iust age, permitted. Who is so ignoraunt, to whom the Scriptures haue not ere now testified, how much longer then in these dayes, the age of mā hath bene in times past? how abundantly do our bodies testifie, how sondry of the inner partes both in magnitude, number, figure, and situation, do differ from those in others of other regions? neither are the same in all our bodies in these dayes, as, in elder time the auncient Anathomistes most commonly obserued: do not their writynges, and our bodies make it manifest to all liuing? but to what end? that it might not seeme to vs incredible, that in men of euery region, like as in beastes, yea in the plantes them selues, is either some thyng peculiar from others, or els some certaine mutation from the first nature to haue chaunced.

As, to come first to the exāples of beastes. In Ciria the sheepe haue rayles a cubite broad, and the goates eares ix. inches in length. What meruaile is it when as the ramme and the ewe, whiche both in Affrica

Iac, 58. in T. 5. p. 6.

Iac, 58. lib. 1.

Arist. Lib. 8. hist. ca. 28.

B. ij.

bearc

## The Proeme.

beare hornes in Pontus a prouince of Scythia, to haue therefore none at all? As other where sheepe, so in Cilicia goates are clipped. The oxen, sheepe, hartes, and such others, are greater in Egypt then in Greece; but for that the dogges, wolues, foxes, hares, and hawkes, are greater in Greece then in Egypt. Oxen in Scythia through cold possesse no hornes. Oxen in Phrygia haue hornes that are mouable. The Isle Ithaca is destitute of a hare, like as the field called *Ager Lebadicus* of a moule, and Sardinia of a wolfe.

If histories be to be beleued, then these are true: if not, what do we with auncient testimonies? why credite we thynges written, or beleue any thyng to be true which our owne eyes haue not witnessed vnto vs? yea let vs reiect the monumentes of our elders, detract their doynge, and wholly obliterate their writynges. And if the bookes of Aristotle, Plinie, and others most famous Historiographers, be worthy to be opened, the beasts in Asia, all more cruell, in Europe more stronger, and in Africa more diuersly fourmed. But, to speake more appertinēt to the body of man, these aforesayd varieties, obserued of auncient writers, arguynge onely vnto vs, that, as beastes are bred diuersly in eche nation, and accordyng to the nature therof, so to be in men some dissimilitude, & by the same reason, was not denied. Every one knoweth that the Moores haue onely white teeth, but blacke skynne and nayles. But it is not a thyng so commō that they, and also the inhabitantes of such hoate countreys, are without seamē in their Sculs, which with vs is a thyng so much approued.

But, omitting those natiōs which differ a litle amōg the selues, let vs come to those which more manifestly vary in figure. In Asia are a people named Macrocephali, hauing very long heades, though first of custome then after of nature: of custome, because they kept the compressed heades of their children, swathed so, till some consistence of yeaeres grew on them, which thyng afterward made their children beget the like, though in tract of tyme, and through their negligence, nature amended that fault. The people called Phasiani, inhabityng a marsh ground and rayny region, are in figure from other men very diuers: as, of mighty stature, and marueilous corpulēt, so that neither veynes, nor ioynates are in them apparaunt, alway bearing a yellow colour, like persons afflicted with the iauides, and in voyce most base and terrible.

It is straunge to vs that womē haue bearded, albeit not so euery where: for in Caria it is a thyng familiar: whereas some of them beyng a while frutesfull, but after widowes, and for that suppressed of naturall course, put on virilitie, being then bearded, hearie, and chaūged in voyce. Shall it be counted a fable that toucheth the transformation of one kinde into another, as the Male into the Female and so contrariwise? surely Plinie saith. No; since him selfe to haue sene a woman chaūged into man, in the day of mariage, he playnly auoucheth. And agayne, a child of a yeaere old, from a mayden to a boy. There are certaine wild men whose

fecte

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fecte are turned backward on the legges, and some of them hauing viii. toes on a foote. What shall we say of the Cyclopes, whose eyes haue in the two apples or balles? I omit to speake of those that haue but one eye: of those that are both Male & Female: of such as haue heades like dogs: of the people which haue no heades: of them who with one legge couer their whole body: of those without mouthes; and so forth of such sortes many, which are in Indie very familiar.

True it is also that the Scythiās, named Nomades, are very corpulēt, and fleshy, their inferiour bellies euer slippery, & their ioynates through moysture very weak, in somuch as they are euer found to haue applied sier to their shoulders, armes, handes, brestes, hippes, and loynes, for no other cause, then for the naturall moysture and softenes; for thus if they should not do, they would not be able to hold their bowes, or cast their darts, for losenes of their ioints, through slippery humors so obnoxious to luxation. And it is no more truly written of the Pygmeiās, then meruailous to our vnderstandyng, since they are of so small stature (for they exceede not in height the length of a cubite) that dayly they are prest to put on armour agaynst Cranes.

These Argumentes, and sundry such others, which Iacobus Siluius hath gathered together, and therefore I thinke them also most fitte for this place, may not lightly moue vs, to beleue likewise that in our bodies sometye sundry mutations do happen.

In places either very hoate, or very cold, men are in countenance and maners fierce and cruell: notwithstanding they that inhabite hoate places are more fearefull, though wiser: and they which dwell in cold, strōger. The Asians are fairer, greater, more gentle, feareful, effeminate, and vnapt to warre for the temperature of the ayre and lawes.

The Europeans contrariwise are in magnitude much different amōg them selues, cruell, of haūty courage, bold, vpriought or honest, and giuen to warre. They differ (I say) in magnitude, and fourme, through the mutations of the tymes of the yeaere, which there are great and often: as strōg heate, vehēmet cold, much rayne, long draught, and strōg windes, whereby euery where, sundry, and many mutations are made. In Asia so the other creatures, and all plantes are more happely produced then in Europe. Many kyndes of men are in Europe, which in magnitude, fortitude, fourme, and stature are much different among them selues. The cause of which varietie is somewhat before touched, but Hipocrates more clearely doth descriue. As they which inhabite a place or region full of mountaines, rough, high, and watry, and haue with the many mutations of tymes much differēt, it is requisite that of their own nature be made many fourmes of bodyes, and such as are laboursome, exercised, and strong, and such natures also to be fierce and cruell.

Agayn they which reigne in places more medowy, or groudes flowyng with herbes, and hoate, & their windes more hoate the cold, & vse hoate, or warme waters, these persons are not high, but rather broad,

B. iij.

with

Phil. lib. 7. cap. 4.

Hipp. lib. de acie. Aquin. et Loc. 1.

Lib. 1. lib. 1. cap. 15.

fac. 52. lib. 1. cap. 1.

Sec. 1. Prob.

Hipp. Loc. 1.

Loc. cit.

Cor. Cell. lib. 8. cap. 1.

Hippocrate. de acie. Aquin. et Loc. 1.

Hipp. lib. 6. Epid.

Lib. 7. Cap. 4.

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with blacke heares, and they more of dusky colour or browne, then are bred in other places; and of their owne nature lesse flegmaticke then cholericke. But they that inhabite a high and pleasaunt place, nor rough, or windy, and haue good waters; these are large in body; straight, and like vnto them selues; endewed with witte and myndes more milde and gentle: like as they of thinne, barreine, and not watry and naked places; neither haue the mutations of tymes temperate, are hard bodies, nor great, rather yellow then blacke, wayward, irefull, bold, and obstinate in opinion. For where often mutations of tymes are; and those also much different, truly there also may you finde their fourmes, maners, and natures greatly disagreeing. The regions wherein tymes and waters are chaunged, or do varie, the bodies there also do vary: since alway, or for the most part, the maners and fourmes of the people do imitate the nature of the region.

If then the varietie of times doth so transmute, and chaunge the state of mans body, as that worthely sayth Virgill (although perhaps he had not altogether this sense.)

*Tempora dispensat usus, & tempora cultus,  
Hac homines, pecudes, hac moderantur aves.*

It is straunge to see how sturdely some strue to deface those, which, full of Naturall pietie, write the truth of their owne tymes. Why, they will haue it that there were neuer Amazones in Scythia; because perhaps there are none now to be founde. Aristotle erred, for saying there were no Asses in Fraunce, Ponte, and Scythia, because now in those countreys they abounde. Hipocrates he is reprov'd, for affirming no kinges to be in Europe, though at this day it possesseth plentie. What is it, that in the tyme of Esculapius were no distillations nor inflations. Hipocrates saw no rigour without a feuer; though in Galens dayes it chaunced often, but now a dayes most often, especially to womē, through a more intemperate diet.

If we shall stand vpon diseases purchased by tymes, yea yet dayly, by the immoderation of diet, when should we draw to an end. In the age of Galen Eunuches did incurre the gowte, though long before, and in the tyme of Hipocrates it was not so. Also the gowte, pleurisie, and inflammations of the lunges were not wont to chaunce before the age of xiiij. yeares, but where standeth it at that stay now? who hath not sene them all at younger yeares? yea some of them at x. ix. yea (though the more meruailous) at viij. yeares of age. The which thyng I dare boldly testifie, since, in Nottingham, in An. 1574, it pleased God to make me the instrumēt of health to diuers childrē, of the ages before recited, finding no present remedy (for to diuers in the beginnyng I assayed other helps in wayne) but Phlebotomie, notwithstanding their tender yeares, the disease beyng the Plurisie, and the tyme of the yeare the spring.

What Artist of experience in these dayes knoweth not, that women (for the most part) do beare males aswell on the left side as the right, and their

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their females aswell on the right side as the left: the transuerse processes of the Vertebres of the necke appeare vnto vs alway as if they were clouen, though to Galen the last of them was seldome so. Os Sternon Galen, with the elders, obserued perpetually to consist of seuen Bones, but we in these dayes neuer inuent the number so large: albeit that we neuer finde the number certaine.

What then? shall we finde the number of the Vertebres alway one? he that hath so the happe, let him set it downe. For my part, amongst those very few bodies, which, also in very few yeares, though to my cost, yet for the very zeale I haue had thereto, I haue dissected, I haue found some of Galens Sceletrons in sundry pointes. It may fall out to be no new saying, that almost in all bodies, some varietie is to be sene.

Much meruailous shall it be to him that vseth dissection, to see such sundry and often varieties: yea, setting aside monstrous shewes, the Anathomist shall see in his own region, and in few yeares, sundry notes of new shapes in nature, not so straunge now, as worthy the notyng.

To pratermitte those whiche Vesalius obserued, because they are confused, let vs come to the most notable, by others descriued and set in order.

Collūbus, that Anathomist of worthy fame, beginning at the head, runneth through the whole body, notyng what new thyng he hath in any particle obserued. So that first he excuseth not the head, but that he hath sene it sometime without seames, sometime with sundry seames, and those keepyng diuers orders, to haue bene compact together. The teeth in diuers numbers: and the neither iawe growne to the vpper. Of the necke, the first Vertebre inseparably growne to Occiput: the number of the Vertebres of the necke sometyme sixe, and sometyme eight with the like varietie at sundry tymes of the other Vertebres. Of ribbes xxij. xxv. and xxvj. Os Sternon consistyng of two, three, and iiij. Bones. The thigh to haue ouergrowne the legge into an incredible tumor. But about all these it is notable that he reporteth of a Sceletrōn, whose Bones all, from the head to the toes, were ioyned together, so that the partie in his lyfe tyme, beyng old, could moue no part saue his eyes, tounge, brest, bellye, and yarde. I passe with silence, the aboundaunce, or want of Muscles whereof he remembreth, and the sundry trases of Veynes, with their want, or extraordinarie diuisions. Of the kidneys he sawe the singular number, although that a greate one, and Splenes so large, as that eche one in waight peised twenty pound, beyng outwardly ouercouered with a Cartilage. So vlcers, and tumours in the hart. So the hedge that distinguisheth the Ventracles of the hart, Cartilaginous. It was straunge to behold Pericardium, the enclosure of the hart, wantyng. What then? he obserued stones in the lunges, liuer, Vena Porta, vrinarie wayes, in the bleeddar, Hemorroidall Veynes, and in the nauell of sundry straunge abscesses, in diuers bodies obserued, the same authour also remembreth. But among all thynges that he hath noted,

B.iiij.

red,

Inc. Sil. Loc. cit.

Col. Lib. 116.

Ulig. de. Meccen. ob.

Inc. Sil. Loc. cit.

Plat. Dial. 3. de. Repub. li. de. caus. sinpt.

Aph. 28. 29. 30. Lib. 2.

Lib. de. coctis pra not.

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ted, this one seemeth most notable, whiche he reporteth of a woman, who had outwardly a perfect shape, & onely the necke of the matrice, but no matrice, seminarie vessels, or Testicles at all: and so oft as she v-  
sed the company of man, (which she did often) she in meruailous sorte  
moued her selfe.

But why stand I so long vpon the obseruations of Columbus, an A-  
nathomist of such yeared experience? come we to them that scarce dis-  
sected two for his twentie, for it is more rare that they haue inuented  
such nouelties.

Lib. de, Var. Corp.  
dulce.

Leonard, Botall, Lib.  
de catarrhis.

Iacobus Siluius in his tyme sawe sundry illusions of Nature, both in  
men, women, and children: in the liuer, spleene, kidneys, ventricle, mi-  
dreif, intrels, veynes, and matrice. All which, to penne particularly, I o-  
mit, together with the straunge, or rather monstrous kidneys which Bo-  
tallus mentioneth, and hath openly depainted: as also his obseruation of  
the foure Offices or litle Bones in the diuision of the brayne: since it hath  
bene my happe to see much in few dissections.

And first (touchyng the Sceleton) in the number of Vertebres: as  
sometyme fixe in the loynes: sometyme foure, sometyme fise in Os sa-  
crum: and sometyme three, sometyme one in Cauda. Among the inner  
partes, I haue obserued the liuer twise deuided into lobes. To the out-  
side and bottome of the matrice I haue found a certaine mole, or masse,  
white in colour, and hard, or in substance Cartilaginous, in fashion  
like the Testicles, as yet within their purse enuolued: saue that it wayed  
almost ij. pound. This bieng cut, cōteined aboundaunce of slimie matter,  
which at the first brust forth thinner, though at last, very thicke and sli-  
mie in deede. Once, in an aged Gentlewoman I searched in vayne for  
the right vētricle of the hart. And once in the hart of man I found a thing  
notable, and which these before named haue made no mention of, that  
is, a bone in the hart, situated at the endes of the vessels inserted there-  
into, as in the History of Bones I haue more copiously handled. Be-  
sides in the same old mā (for so he was in deede a man prest to the ground  
with dayes) I saw one of the vrinarie vessels, which, for the space of an  
intche (or more) in length, had wholly possessed a Cartilaginous sub-  
stance, which seemed still to encrease.

But here perhappes some are ready to obiect, and say, why what  
then? do you intend to reiect those authorities which so oft you haue  
here alledged, nay, not alledged, but rather out of whose mynes all  
this treasure is digged? no, but I could wishe with Siluius that eue-  
ry one might be more zealous to searche the truth, then busie seekers  
to finde oportunitie agaynst their elders. And those in deede the pa-  
rentes of all Phisicke. For if in any thyng they disagree from the bo-  
dyes of other regions, surely these rehearsed Argumentes are suffi-  
cient to proue the same farre more worthy to be imputed to the varie-  
ties of regions, and chaunge of tymes, then otherwise, with foule  
obloquie to spurte our elders, whilest we ourselues in the meane tyme,

Loc. cit.

as

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as maleuolent detractours are publicly denounced. *Siluius* therefore  
wistheth him that findeth any thyng otherwise then Galen hath written  
it, to ascribe the same as a certaine addition to Galens Anathomie, els  
frendly to admonish the reader therof.

As for my selfe, I confesse I haue in sundry places cited, and as it  
were enrolled Galen in sundry errours, yet not by halfe so oft as my au-  
thours haue prouoked me? for *Vesalius* chiefly, and *Collumbus* (as I sup-  
pose) haue spared him in no place. Which hath excited me (freedly Rea-  
der) familiarly thus to warne therof in the begynnyng, that when thou  
readest them, thou mayest rightly know from whence they come.

In the meane tyme to come to the matter proposed, I commit to  
thy diligence in the begynnyng the History of Bones, the frame of the  
body, wherein (of truth) attentiuenes ought to be vsed, both to carie in  
mynde, together with thy eye, the direct sense of the present descri-  
bed part, or rather (if it may be) to conferre the same with the Scele-  
ton it selfe, as also because it is an introduction to the whole History of

Man, and may be called the keye of knowledge to Anathomie: with-  
out the perfectiō wherof, the rest is not onely obscure, but almost

vayne at all to read. After the Bones, ensue the Cartilages: then

the Ligamēts: after those the Muscles: next the Muscles the

nutritiue partes: and next the nutritiue the genera-

tive partes. Then at length the spirituall mem-

bers: and finally the animall. To these I

haue added a ninth, least (otherwise)

the marey, Periosteon, and

the heares should haue

bene sought in

vayne in the History of Man. All these to my power,

I haue saythfully, and therewithall sufficient

briefly, compiled together. Now re-

steth no more, but read,

and enioye.

\*.i.

¶ *Iulius*



Julius Borgarucius amico suo

Banisterio. S. P. D.



*Q*ua olim de fabrica humana ab antiquis Graecis Lico, Herophilo, Erasistrato, & ante eos Hypocrate, postea à Galeno summo viro & Philosopho praeclarissimo graecè fuerunt illustrata: tandem a recentioribus Curtio, Sylvio, Vesalio, Faloppia Latine posteritati cōmendata, tu Anglicè reddidisti perspicua facilitate, ordine cōpositivo, maxima doctorū virorū admiratione. Legi integrā tractationem de ossibus, Ligamentis, & Cartilaginibus, quam non solum probavi, sed, ut omnes intelligerent, qui de re medica iudicium aliquod ferre possunt, enixè contendì, quam bene de republica tum agendo tum meditando nostra merearis: de Musculis, Venis, & Arterijs reliquum, ut audio typis exendi, adhuc non vidi. Sed si ex unguibus Leonum quis facile agnoscat, ex istis tanquam sint prologomena maiarum rerum, videri te operam & industriam collocasse in explicandis naturae miraculis non exigenti: quam Theoricam Anatomies partem nunquam assequi potuisses, nisi resolutoria methodo praxim adunxisses, & nocturna diurnaq; manu-versatus esses in separandis, incidendis, distinguendis partibus humani corporis, quibus non modo quo pacto organice à similibus, sed qua substantia, qua connexion, & quo usu inter si distinguantur diligentissimè abs te fuit adnotatū. Hoc tamen video: ut de suis libris Physicæ auscultationis Aristoteles Alexandro magno literas dedit, Anglicum istum opus tuum Anatomicum doctis tantum vel in arte plurimum versatis usui futurum. Nomina enim dum vertis Graeca & Latina, & dum ex lucidissimis fontibus hauris perennes aquas, qui vel illa non callent, vel de Helicone nunquam degustarunt, illotis manibus accedent ad perscrutanda naturae miracula, & recedent magis ac magis coinquinati. Tu probis tantum & filijs artis dum siudes placuisse, non est cur vulgus aut formides, aut imperitiæ malevolorum (homine imperito nihil quicquam iniustius) studeas velle satisfacere. Cura itaq; valetudinem tuam, & nos ut facis ama.

Valc.



William Clowes Chirurgian, to his  
longing friend Iohn Banister.



*W*hy noble skill in Surgerie (for so we call it heer,) Thyne honest lyfe, and faythfull hart vnto thy countrey decri, Well known to me (good Banister) thy poore and loyall friend, I would I could in skilfull Verse so cunningly commend, As well I know it well deserues both praye and prayeagayne. And sure I am that this thy toyle, and heere employed payne For paynting out the frame of man, in this our mother toung, Could out of learned Latine workes, heerehence hath onely sprong That thou thereby thy countrey men mightst further much in skill: And geue them light that erst they lackt, as sure (I hope) it will. Thou wrightest not for the learned sort (I know) that were but vayne, But hopest to helpe themeaner folke. And so, I trust thy payne Shall vyvne such prayse of skilfull men, as paynfull toyle may craue, And as a mynde that meaneth well of duety ought to haue. If error ought hath scape thy penne, or paynter hapt to haule, Let that no whit dismay thy mynde. None escapes deuoyd of fault. Where skilfull men geue iust reproofe, with carefull payne amend it. Regarde not much the rascall sort that blyndly reprehend it. For as we know that men be men, and casely apt to fray: So Enuyes Imps do bend them selues to sclander euery way. My selfe of late hauctried in that so small a worke of myne, Wherein I sought no praye to vyvne, nor get a name deuine, But onely to content my friends, whose earnest suite to craue it, I could in no wise satisfe, but so, as they might haue it. Yet some I found with readyer tonges forthwith to reprehend it, Then fraught with skill to frame the like, or ought perhaps to mend it. But who so ready to controll, or sit to carpe, and clatter, As he that hath the dymnelt sight, and iudgement in the matter? What if I did somewhat omit? what if the Print were lame? What if I meant at leasure more to haue enlargd the same? How euer it be, I neuer meant to please eche curious hed, Syth who so toyles him selfe in that may bryng a foole to bed. Wherefore my good and honest friend referre the whole successe Of this, and all thy toyles to hym that will thy trauailes bleffe. And as thou hast by labours great, obtained a grounded skill, And settled sight in Singery, so I exhort thee still By skilfull workes the fame of such a facultie to rayse, Wherein we know most famous Clerkes haue, often, spent their dayes, And trauailes great: in hope thereby immortal fame to vyvne, Whose worthy workes do well bewray their paynfull toyle therein. I speake not of the famous Greekes, and fathers of the Artes: Nor Guidoes workes, nor Vigoes workes that write of other partes: But of the whole Anatomic Vesalio pasing well. Collumbus and Fallopius workes, how much they here excell. Whose skilfull penne haue paynted so ech part and peece of Man, As none lookes now to better it, (I thinke) nor euer can. Whose lasting fame no age shall once be able to deface. Among the which (good Banister) I with to thee a place. And so Adeiue. And thou (good Reader) pardon I thee pray My penne that in this homely ryme hath raungd to farre astray. But three fold wayes enforst thereto. For zeale vnto my friend. For wronges of myne. For my professed Art. And so I end.

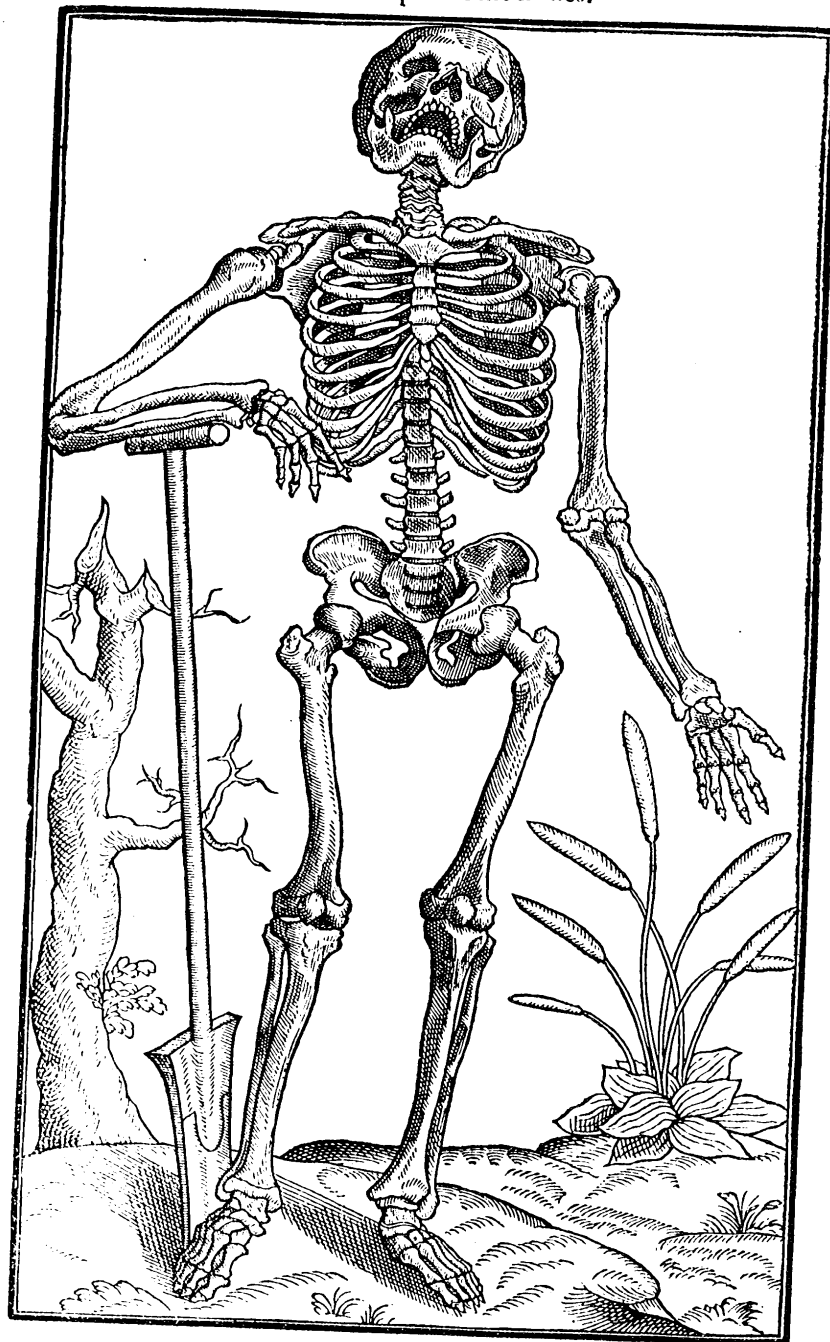
\*.ij.

¶ The





The fore part of the Bones.



# OF THE HISTORY OF MAN, the first Booke.

## OF Bones, the frame of the Body.



So the good and expert Architect, hath a singular care, first in edifying his house, to be well advised of the manner of his foundation, and hereby framing of his Timberworke, before he lay on Brick, Tile, Slate, Lime, or Plaster: So it becometh us, in searchyng the true Secrecie of this Mysterious Science, and body of Man, first, before the partes supported, distinctly, and deliberately, with diligent care, to consider the partes supporting. And the reason is good. For if you doe not first exactly examine, and to a sufficient fulnes feede your appetite, with the diligent peruse of this History of Bones: you shall finde the rest of this booke, not onely in readyng unsauery, but also to your sensible vnderstandyng very obscure. Wherefore of the Bones of mans body, what they are, and how they are contrived, and combined, after all manner, order of knittynge, & articular motion, the good Physician (sayth *Galene*) ought not to be ignorant. But amongst all things to the arte of Medicine appertinent, that thing that is necessary to Nature (as the scope whereto we ought to cleave) we must study to conserue and know. The Bones therefore, by very right we call the foundation of the body, since they not onely make firme the partes, but also sustayne and support the body. When that we in this our first enterpryse intreate of Bones, it neither seemeth voyde of much authorized maintenance, neither yet frustrate of the splendant sparkle of reason, which shall light ech mans iudgement into the right conducted way of truth. Whence therefore are the wordes of *Vesalius*. All the partes of mans body are either Similar, or Simple wthly sence, as are Ligamentes, Fibres, Membranes, Flesh, and Fatte: or els Dissimilar, or Instrumentall, as the Veine, Artery, Sinew, Muscle, Finger, and other Organs of the whole body: which are made so much the more instrumentall, by how much the greater store of Similar partes with the instrumentall are compounded. As for example, the handes & head &c. The Bones are of all the partes of the body most hard, & dry, of earthy substance, cold, & voyde of sence, the sixth onely excepted. But here you must vnderstand, that they are not accounted voyde of feeling, because they are most of the terrestriall element, but because no portiō of sinewes, which are the immediate organs of sence, is in their substance disseminated. Neither was it the mighty pleasure of God (whom we call Nature) nor any parcell of his decre, that the substance of the bones at all should be made sensible, as any reasonable man must of force confesse, if he note but how the whole mole, and pack of members are sustayned by them: who with their many motions, do carry, and recarry all the other parts of the body with them, which argueth, that if they were (as some say) delighted with the perfection of feeling, then the moitue vertue of the members woud by exceeding payne be taken away, or els at least frustrate. Wherefore it is odious to heare them, that blushe not obstinately to affirme, that in bones is conteyned a singular sharpnes of sence, when as neither reason can rule them, nor experience satisfie them. For belike

*Fuch. li. 1. ca. 2. de Vasa.*  
The reason why the Anatomy of bones occupieth the first place.

The doctrine of this History is most obscure, butt the bones be first learned.

*Lib. de ossib. cap. 1.*  
We must study to know & conserue that which is according to Nature. The Bones the foundation of the body.

*Cap. 1. Epith.*  
General division of the partes. What are the Similar partes. What are the Instrumentall partes. The nature and substance of bones. All the bones except the teeth, are insensible.

*Col. li. ca. 1.*  
The cause why bones are insensible.

The same is the immediate organ of sence.

Note that throughout the History of Man, we cite Nature, for God.

The reason wherefore nature made not the bones sensible.

Some affirme bones sensible, although to their great shame.



The willfulness of  
such dyuetye this  
to an horrible au-  
dacity, as will  
needes make the  
bones to sele.

The experience of  
Chirurgicall co-  
fucture this cō-  
fute, nothing more.

Perioleous.

The sensibility of  
Perioleous not co-  
sidered was the  
cause of their er-  
ror.

Perioleous abraded  
no fence is differ-  
ned.

The first bone  
of the bones.

The second diffe-  
rence of Bones,  
from their mag-  
nitude.

The third diffe-  
rence of bones, ac-  
cording to their use.

Some great

Bones have no  
manifest hollow-  
ness, as the bones  
committed to os  
sacrum, os sacrum  
it selfe, and the  
Scapula bones.  
Some bones are  
small, but notably  
excavated, as of the  
fingers.

Lab. r. de v. par. 11.

The Sesamum, the  
bones of the nose,  
& Osicles of head  
eyng, are included  
by Vossius, of So-  
lio.

Col. cap. & lib.

præd. 1.

The Brachiall  
root, to the 1000  
of the continent  
Vina, in the wrist  
of the hand.

The use of the  
bones and 1000  
of bones.  
Now those that  
have no holes  
without are not  
excavated.

What an Appen-  
dage is.

they will either proue that the Bones are the originall of Nerves, and so conse-  
quently of the braine: or els that the Bones are produced and made of the mat-  
ter of the braine, and so to be sensible as the Nerves, whiche are the organs of  
sense, as that sufficiently be declared vnto you in their proper description. But  
yet further to confute their vnhamelastnesse, the good Aristotle, who in his lyfe  
tyme, & dayes of experience, \* either scaleth, cantrigeth, or seperateth Bones, is  
able to testifie abundantly that after he passeth (in his operation) Perioleous,  
the party is no longer vered; with such payne as appertayneth to the sensible  
partes. This περιόλιος; (for so it is termed of the Grækes, the \* Latines haue  
not knowen it) is a certaine Membrane, that enuoyappeth, & cloatheth the bones,  
by the benefite of which Membrane, and not of their owne proper Nature, the  
Bones are supposed to feele, although in deed they doe nothing lesse: for that once  
\* abraded, or taken off fro the bone, neither can they by sense afterward discern,  
whether you cut, burne, deuide, or otherwise at your pleasure handle the. Where-  
fore it is a shame if we otherwise affirme: but with Gal. Vesal. and Col. conclude,  
that Bones of their owne proper Nature are altogether destitute of sense, except  
(as I sayd before) the teeth onely which are approued sensible, as experience ou-  
erscholeraistres teacheth vs.

Now as touchyng the proper differences of Bones \* this is the first, that  
they differ not only in names (when as euery one chalenge to themselves proper  
names) but also in magnitude, some being \* small, and others greater. Agayne  
in fourme, as some long, some short, diuers triangled, others quadzangled, \* &c.  
Or otherwise according to the figure: as smooth, or rough, defended with pro-  
cesses, or hauyng appendances: some distinguished by commissures, others also  
otherwise. Whereouer they are distinguished by their vses: Since to one onely  
function or common office, all were not ordained, which argueth also the great  
diuersitie of their fashions & fourmed shapies. For some are playnly hollow, nei-  
ther alike: but some of them with moze large scope, others also straiter, yet not  
prouing the bone either larger or lesser thereby: when as \* some being great haue  
no manifest hollownesse in them, as for example: The bones committed to os Sa-  
crum, os Sacrum it selfe, the Scapula bones, & others named in their places. Some  
agayne are \* small, but much hollow, as the bones of the fingers contrary to Ga-  
len's, as we will proue in their proper place. Andreas Vesalins also supposed  
that neither the bones of the nose, and \* Sesamiz, neither the little Ossicles that  
constitute the organ of hearyng, should be otherwise then made of massue Soli-  
ditie: Which (notwithstanding) Columbus doubteth not to denye: for proue  
whereof (sayth he) by eake one of them, either greene, or dyed, and you shall finde  
the substance therof spongie, not vnlike a thicke Pumme Stone. And these bones  
also although they seeme so Solid, shew in the outward partes of themselves cer-  
taine holes, some greater, and others lesse, as is to be sene in the Brachiall teeth,  
and many other bones of the fingers: which the Diuine creator hath comman-  
ded to be Perforated. Wherefore euident ynough those holes are not in vayne, they  
giuyng place to the veines and bloud for nourishment, as also to the Arteries for  
their vitall heate: whereas such as haue no holes, to admit within them, either  
veines or Arteries, such we say are nourished, and fed by the partes adiacent.

Now forasmuch as in this our narratio of bones, diuers straunge names, &  
such as to the simpler sorte are altogether vnknownen, be here & there scattered:  
It shalbe very conuenient before hand, bytely to table out an expositio of them:  
That thereby the reading of such in their places (being now first cracked and sha-  
led from their obscure Huskes) may be moze perspicuous, and pleasaunt to your  
contemplation: which otherwise would be loadsome, and tedious.

And first to begin, we will say what is vnderstood by this word Appendance,  
which

which the Grækes call επιρριον. It is nothing els, saue a bone springyng to a  
bone: or rather an addition or coagmentation of some bone, obteinyng a pecu-  
liar circumscription, yet not being a trew portion of that bone, whereto it is  
committed. In yong creatures therfore it is easely discerned, but in older and  
greater moze hardly: for triall wherof, if you boile the bones of a kid, or lambe,  
or beale, you shall easily see certaine portions, & endes of them, to deuide, either  
by them selues, or els with small constrainte. And those Particles so annexed to  
the bones, are called Appendances: which (contrary to the mynde of Galen) we  
must needes affirme to be softer then the bones them selues: since we delite oft  
tymes with our teeth, to plucke the Appendances of small Bones, & to chaine of  
them in our mouthes: for the pleasaunt iuyce that often they retaine. Which  
contrariwise we cannot do to the bone. Neither are they lightly to be losed, or  
deuided from the bones, by euery motion: for that nature hath so well provided  
for the turnyng of the ioyntes, with such softe and supple Cartilages, as ther-  
by in the motion of the bones, no occasion can be giuen, by any strainge to iniurie  
them. The vse and chief commoditie of them, is excellently recited of Colum-  
bus: or rather inuented: and so as no man hath fully hitherto iudged: although  
the thing be woorthy knowyng, and exceeding necessary. And one thing among  
many others he testifieth, that nature hath made nothing in hayne, but eue-  
ry part to good purpose, and seruyng to some vse. Realdus I say therfore found,  
that Appendances were in that order to the bones annexed, to the end that from  
the place of their coniunction, Ligamentes might be produced and made, to stryge  
them, hold, and stablish firmly, the composition and knittynge of the ioyntes: as  
you see the toppe of the thighe, with the bone of the hippe: and the neither part  
of it, with the bone of the legge. Likewise the bone of the shoulder, with the  
scapula bone: and that which in like sort is tyed to Radius and Vlna. As for those  
bones that haue no Appendances, how they are united. I referre you to the Vi-  
sioy of Ligamentes to finde. And not onely where the ioyntes are, do these Liga-  
mentes, spring, but where no Coarticulatio is made also: as in Ilium, the Scapula  
bones, & some processes of the Vertebres. Thence also procede Ligamentes, ne-  
cessarily chauncyng to the framing of the good constitution of Muscles, as in their  
proper place is to be sought. Whereby it cometh, that from thence very many  
Muscles haue their beginnings, whence also Ligamentall Cartilages procede:  
for so we thinke it good to call them, that to strengthne the Muscles, are amongst  
them disseminated: endyng also at their Tendans. Now agayne it is manifest,  
that Galen (for all his industrious search) sayled to finde the truth, in affirmyng  
these Appendances to be added to the bones, for the conseruation of the marcy,  
with in them included: but then sayth Vesal. Now hapneth it, that other bones,  
in which are no cauities so notably allotted to the receiuyng of marcy, should  
(notwithstanding) also haue proper Appendances: euen as those, that are greatly  
hollowed. As for example the scapula bones, the Vertebres, & other small bones,  
which not being much medullous, are neuerthelesse not of Appendances desti-  
tute. But pretermittynge this conuict assertion of Galen, it is sufficient, that the  
truth is touched by the aforesayd reasons of Col. prouyng how Ligamentes by Ap-  
pendances are most engendred, and consequently the two proper gifts giuen by  
to Ligamentes. Which, whilst they are so necessary, as we haue proued, that the  
generation of Appendances be very vile, and profitable, who can inuent to deny:  
since their vses Sublated, but a fewe places can you finde, whence Ligamentes  
should sitly procede. And thus much you haue to vnderstand, as oft as you read  
of Appendances: in what bone or part so euer it be.

Απορριον which the Latin inter pretours call Proccessus, is thus: whē a bone in  
any part, stretcheth forth his substance in excreasng maner, as a knot swelling  
C. ii. out

In yong persons  
the Appendances  
are easily observed,  
but not in old.  
A playne shew.

The substance of  
the Appendances  
is softer then of  
the bones.

A prooue, for whē  
we eate meat, we  
will often plucke  
of the Append.  
of the bones, &  
chaine them.  
Why Appendances  
are not worde  
of by comminatio  
nyng of ioyntes.  
Col. lib. 2.

The vse of Appen-  
dances for other  
wise then any be-  
fore: a Col. euer in-  
uented.

How the Bones  
are united shal  
haue no Appen-  
dances.

Ligamentes not  
only springing  
from the  
iointes, but also  
where there is no  
iointe.

Muscles often  
spring out of Li-  
gamentall Carti-  
lages.

The Ligamentall  
Cartilages do as  
last end in retyng  
among the iointes  
etc.

Col. part li. g.  
Col. suppose the  
Appendances be-  
ned to hold in the  
marcy.

A playne consti-  
tution.  
Ligamentes serue  
to the byndyng to-  
gether of bones,  
and to the consti-  
tutio of tendans.  
There are but  
few places where  
the Appendances  
are for the pro-  
duction of Liga-  
mentes.

What a procces-  
sus, called of the  
Grækes Απορρι-  
ον, is.

The first difference  
betwene the pro-  
cesse and appen-  
dant.

The second diffe-  
rence.  
Some appendices  
haue processe.

The third diffe-  
rence.  
Howe processe  
may haue appen-  
dances.  
The processe  
Trochanteres doe  
some appendances.

Collocat.

The fourth diffe-  
rence.  
It is scarce possi-  
ble to find a bone,  
whereon appen-  
dances haue processe.  
What bones haue  
appendances.  
Howe the proces-  
ses differ among  
them selues.  
The processe cal-  
led Styloides.  
The processe cal-  
led Corona.  
The processe cal-  
led Anchiroides.

A processe with a  
depressed.

A processe tog and  
prominent.  
A processe with a  
convex head.

What is ment by  
a necke in the  
description of  
Bones.

Why in processe  
a head is made.

Concauities are  
euer answerable  
to the heades of  
the processe.

What is the Aca-  
cile.

What Glene is in  
the cauities of  
Bones.

Some cauities  
in Bones are en-  
treated by a pro-  
cesse & cartilage.

out from the stocke of a tree, or as some Gibbous Tumor exceeding the height of the naturall places nere unto it: so such places of bones, as are apparantly to be discerned to exceede other partes, are rightly called Processe, sufficiently differ- ring from the Appendances: for these are right parcels, and true partes of the bones them selues, whereto they are fastened. Also Appendances them selues haue Processe. As the bone of the cubite called *Vlna*, and the inferior part of *Ti- bia*: as also other bones diuers: as will appeare to you plenteously hereafter. A- gain, to some processe Appendances cleaue, for the inferior processe of the Scap- ple bone that is like the fashion of an anker, and the ridge of the Scaple bone which in like manner is a processe therof, haue Appendances: but note that the processe of the thighe called *Trochanteres*, or *Rotatores*, are more iustly to be ter- med Appendances, then thynges with Appendances munit. For all that part that swelleth forth (whiche therfore they call Processe) holdeth the place of an Appendance, so that the Processe and Appendance there, is all one thyng. Yet *Vesalins* made a difference betwene them: but when as by taking away the Ap- pendances, the Processe also are gone, we must Judge (saith *Columbus*) them in that place all one: and the Processe, & the Appendance, the same thyng, one that the other is. Furthermore the Processe and Appendance differ thus. For it is a very small bone, out of which appeareth no Processe, neither may it be possible almost, to finde such one, as exceedeth in no place: but there are many bones de- stitute of Appendances, as those of the head, of the vpper iaw, of the wize, and such other. Neither do the Processe not differ in them selues, chusing ech one a sundry shape: for some of them are small, and like the fashion of a sharpe hookine: wherfore the Grecians call such Processe, *Styloides*. Others also being sharpe but not so slender, as the knagge of a hartes horne, that is to say thicke and poin- tyng, such as are to be found in the neither iawe: *Galen* calleth such *Corona Pro- cessus*. But besides, there are some that represent the similitude of an anker, as the inferior Processe of the shoulder blades, called *Anchiroides*. Others end, or leaue at a head, and that two maner of wayes: for some haue that head depressed, as the bones of the middle of the hand, where they ioyne to the wize, and of the insteppe, meeting with the Bones of *Tarsus*, and *Fibula*, & the neither part of *tibia*: certaine Processe haue their heades longe, and prominent, as the vpper head of the thighe, where it is knit with the Bone of the hippe: Others hauing round heades, as of the shoulder, and shoulder blade, likewise the bones in the middle of the hand, ioyning to the first ioyntes of the fingers: And of such Processe as haue long heades, we call the slender part therof, from the body of the bone, unto the head of the Processe, a necke: forasmuch as that space is like unto the necke: as if shalbe playne unto you, in beholding the necke and head of the vpper part of the thighe, where it maketh entrance into the hippe. For this cause therfore are the heades, of the Processe made, that by touching with in the cauities of other bones adiacent, they may the better Coarticulare and ioyne together. It is to be noted here, that as the fashion of the heades of the Processe, are diuer- sified according to the places, so the hollowes that receiue them, must of necessitie also be diuers and different, euer answerable to their proportions. A deepe hole, or cauitie therfore, you shall call after the Latins *Acetabulum*, after the Grækes κοτύλην or κοτύληδωγα, our English phrase offeth no proper terme for it, unlesse we shall call it a caue, case, or cuppe, in respect of that, which into the hollowes therof it admitteth. But the playne and obscure, is called γλυν, whose cauitie is so shallow, as at first sight can scantly be discerned. Forwithstanding there are certaine Circular Processe, which augmet the profundities of such Celes as are largely excaued, which being placed in the vpper part of them, are called *Labra*, or *Supercilia*, as it were the lippes, or browes, or as we may terme them the

bzinkes

bzinkes to those canes. These concauities are also encreased by the Gristles in some of them growing, as appeareth in the caue of the Scaple bone, where it agreeth with the shoulder, and in the Articulation of the hippe with the thighe: and those Processe and Cartilages are they, whiche make the more difficultie in Luxation. Further not onely in figure, but also in number these Processe are diuers, and disagreeing, some Bones being endelued with very fewe, and others agayne with many: as shall better appeare in their particular descrip- tions. But now since Nature (as we haue sayd) made nothing in vayne, but all to good purpose, and (as we may say) needfully forecatted, let vs see to what end and purpose, were these Processe ordeined. You shall note therfore, that not for the commodious Articulation of Bones onely, but because from them al- so, as the springes from mountaines, so the Muscles are either from them produ- ced, or to them implanted: hauing the offices also of Propugnacles, or resistant defences. Such as are of the shoulder blades, and the Processe of the Vertebres. *Baluides* or *basis* are certaine corners, after the order of a firmament, or ground, beyond the which, and naturall vse of the member, the bone may not be suffered to moue: as appereth by the Cauities of the arme, that is, the Anterior corner ad- mitting the first Processe of the Cubite, at what tyme it is extremely bowed: and the Posterior Processe of the Cubite, that coucheth in the hinder corner, when Extension is made neither can any of the Processe passe further in their Celles, then the utmost feat, to them by nature limited.

Thus (frendly Reader) thou shalt finde it expedient, before thou enter fur- ther among the description of Bones, exactly to learne, and to haue in mynde (as the proverbe is) at fingers end, those fewe decyphered names, which the an- cient Anathomistes haue giuen, according as it seemed best to their learned o- pinions: and that either for the fourme, situation, or properties of the partes. Which although we haue so farre accomplished, yet stay a while: for before I en- ter fully and directly to speake of euery particular Bone in the body, you shall commit unto your memory, a word or two of the maner how mans body is con- strued, and combinat, as touching the frame and Coarticulation of bones: as also of the strange, and diffused names, wherewith their kindes of knittynge, in eche respect are nominated.

First therfore we must consider, how vnprofitable unto man it had bene, if the frame of his bones had bene continuall, whole, or Solide, so consequently his motion, no otherwise then a brassen or stony Image: Whereas now to an infinite number of Artes, that need innumerable actions, man, by natures poudent worke in the construction of his frame, obtaineth accordingly, the passing per- fection of mouing, fitte for euery one. When so it were requisite, that the compo- sition of the bones should neither be dissolute, and vniointed nor yet altogether whole, and continuall: but so made, that by the fitte Coarticulation, and knitting together by proper ioyntes, they might as well bowe, and extend, as also remaine one depending on an other, and together supporting. And notwithstanding the needfulness of such Insoliditie, it is otherwise as requisite, that the Bones were not continuall, but rather by proper meanes vnited, and that is for Transpiratio sake: as in vniiting the Bones of the head by Sutures: and agayne for the diuer- sity of the partes, as where the more hard, are committed to the more soft.

Withens then Nature (as we say) in construing, and compoundyng the bones of mans body, hath not done it after one absolute reason, or maner, which euery man might easily comprehend, but so diuersly, as seemeth sufficient, tedious for the wisest: I will let you heare the opinions of the best learned, and famous A- nathomistes, with the meaning of the strange names, wherewith they haue entituled the diuers compositions.

What maketh the fashion of the thighe more dif- ficulte.  
Processe differ in number also.

The first vtilitie of the processe.  
The second vtilitie

The third vtilitie  
Gall. 2. v. part.

What is to be in- derstood of this in the description of Bones.

If these thynges be not learned, the v. story of bones is obscure.

The reader must be perfect in the construction, & diuision of bones, in these termes, before hee wade further in this history.

Cell. 2. ca. 3.  
Why mans body was not made of one bone, solid, & continuall.

The fashions of the head are made for the cause of transpiration.

What meaning is  
proper to the  
words of Polibius,  
hualis,

*Arthrodia* is a coniunctio of bones, wherof the one hath a head depected, the other a shallow or playne cavitie, called Glene as befoze sayd, aunsweryng the head of the other so coniectively, as it is hard to knowe the head, from the shallow: contrary then in *Enarthrosis*: wherby it commeth to passe, that the moving is not so euident in *Arthrodia*, as in *Enarthrosis*. Notwithstanding in the same *Arthrodia* is one mouing moze euident then an other, although euery kynde of mouyng therof, is scarce euident: yet that, that is lesse euident, is to be altogether obscure, in comparison of the moze euident. Wherefoze the moze manifest motio in *Arthrodia*, shalbe attributed for a kynde of *Diarthrosis*, & the obscure action, to *Synarthrosis*. Crāple of the mouyng of *Arthrodia*, vnder y kynde *Diarthrosis*; (which as you heare hath the moze manifest motion) you may take by the coniunction of the ribbes, with the Vertebres, & their Processees. Who are both cōstringed, & also dilated: as to euery sensible man, appeareth in bzeathyng. But *Arthrodia* you shall note somewhat moze manifest, in the Articulation of y first Vertebre with the scēd, & y bone *Radius* with *Ulna*. Cōtrary crāples of a moze obscure *Arthrodia*, are y bones of the middle of y hād, with those of y wryet: In which alfo some mouyng, after a certaine maner is to be discerued. As if in bowyng, you wishe to moyng the little finger & thombe together, you shal well discern the bones in the middle of the hād, (which otherwise the hād being stretched forth, & straight extended did shew a straight figure) to be Circumduced, and obliquely moued. Which

But now let vs come to euery kynde by hūm selfe. First *Sutura*, whiche the Grecians call *σῆψ*, is a contunction of the bones; in such sorte; as sheweth like vnto the shape of a seame, or a mutuall Congressse of twō bones, fasted like vnto a salue; which layd together, the teeth of eche, one, entreth the spaces of the other: whereby they are mutually composd and one with in the substance of an other. Some adde an exāple of the Commissures like the nāples, not so; that they mutually respect one another, but do occupy and stoppe the vacant places residēt betwene the nāples of the fingers; yet they seeme to approach nerer, to the nature of the thyng, which preter the similitude of salues; befoze the likeness of nāples:

The manner of closing, assimilated to the teeth of two saws put together, is most in use.

Three seames in the head, in very aged persons (saith apparians.

The seame called Stephana in the fore part of the head.

The seame called Lambdoides in the hinder part of the head.

The seame called Oculi, or sagittalis, along the toppe of the head, when the scalle bones with the temples are united by a Suture, the same Suture is not deeper.

Those scalle bones are for the most part rather united by Hamonia than Sutura.

Old writers haue adprehended Hamonia under the name of Sutura.

Those bones do unite agayne in fourme, that participate both with Hamonia & Sutura.

Examples of Hamonia.

What is Gomphosis.

Example of Gomphosis.

The vertebrae of the Spine are united together by the meanes of Ligaments, Cartilage, & Sutures.

What Bones are united together by the meanes of Ligaments, Cartilage, & Sutures.

What is Synchondrosis.

What is Synchondrosis.

Old writers comprehended the Ligament under the name of Sutura.

What is Symplysis.

What is Symplysis.

Old writers comprehended the Ligament under the name of Sutura.

What is Symplysis.

What is Symplysis.

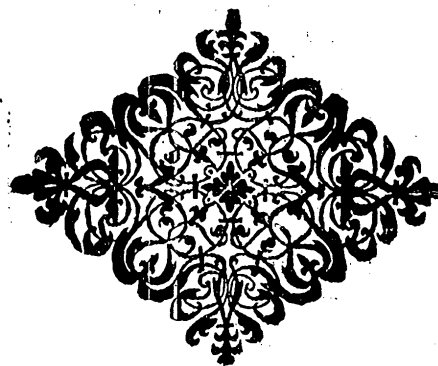
since those are rare to be found, these very often: Of which sorte, be three in the head. And these seames, which in old men are hard to be found, (For scarce their traces may be imitated, but rather do go together after the order of appendages:) in younger persons notwithstanding are very conspicuous, and playne to be seene. Wherof one of the is in the fore part, called *separata*, an other in the hinder part, named *λambdoides*, the third is straight in the middle of the top, in like sort (of the Grecians) called *εβλιδια*, as we should say, *Sagittalis*, wherof in the proper place hereafter we will speake at large. And besides these, we must needs confesse moe Sutures to be in the head, if so be, you will accompt the scalle Bones of the temples, to be fastened by seames: which to be found very like in some scalpes, I deny not in deed: that is to say, toothed like a sawe: as we sayd euen now: yet for all that, it is but so in few, & those also lyeng aloft of the other: wherefore doubtlesse the true vniō of such Bones, is rather to be attributed to that kynde of Symphysis called *Harmonia*, then *Sutura*. For by *Harmonia* is understād, that kynde of structure in the Bones, made by a simple meeting, that is to say, where neither swellings out, nor any cauitie, neither roughnes at all sometyne is found. Diuers auncient writers, haue comprehended this kynde *Harmonia*, often under the name of *Sutura*: as when broken Bones ioyne mutually agayne, by *Harmonia*, and *Sutura*: and neither way simply: but some where concurring euen, & in other places ranged: being therfore a mixed vniō, participating as wel with *Harmonia*, as *Sutura*. Wherfore not onely to beare the name of one of the. For a simple line, and Harmonicall meeting, haue the Bones of the nose, and such also is that, which constituteth the Palate: or to say more truly, deuideth it long wise in the middle. Of this sort likewise, are all the Commissures of the upper iaw, whose Bones haue onely lineall distinctions.

The third of *Symphysis* differences, is called *Gomphosis* (albeit that *Vesal*. denieth them otherwise) and this kynde of vniō is, when one bone, with in another is infixed: as a nagle into wood, or other thynge, which being pulled out, the place after is left vnsound and empty: euen so, the teth haue in the iawes the proper selles, whence they may be drawen when occasion is offered. But besides the fastening, that they haue in the iawes, in dyed bodies: in creatures yet liuing, they are also clothed aptly with flesh about their rootes, and contract, and filled on eche syde with gowmes, which flesh is made so callous, and indurated, as that the teth thereby are not a little delited, and howltered: and the tooth being drawen out, it cloyeth over the hole therof, so hardnyng, as that it is seruiceable in stead of the tooth. But in dead bodies, where this flesh is dyed and consumed, or otherwise taken away, the teth may with small labour, be pulled forth. So that it is most certaine, all bones, by the benefite of one thing or other, to be coupled together, though among them selues, diuers. And besides all these kyndes of Articulations rehearsed, we haue yet agayne, to affirme the coniunction of Bones among them selues, to be by three kyndes of meanes. For either a Cartilage goeth betwene, and this vniō the Grecians call *Synchondrosis*: as els by the helpe of a Nerue or Ligament they are conioyned, and that they call *Synneurosis*: be theyne the whiche, that is to say, the Nerue, and Ligament, in deepe old writers could discerne no differences: albeit we shall call it more rightly a Ligament, which the Grekes nominate *Syndesmos*: therfore this knittynge, after that rate, *Syndesmosis*. Either els the vniō, is made, by the apposition of fleshe, therfore by the Greke name *Sysurosis*. But that kynde of copulation called *Synchondrosis*, is to be noted by the bones of the breast, and Pubis, the Vertebres themselves, and partes constituting *Os Sacrum*, as also those with *Os Sacrum* committed: so are Appendages ioynd to their bones by a Cartilage. Examples of *Synneurosis*, are all those bones, in which are Ligamentes to be discerned, passing forth from

from that part, whereas the Appendances are fastened to the bones: for with such Ligamentes those bones and ioyntes are clothed, and colligated. There are also certaine strong Ligamentes, lyng after a certaine manner, in the middle of the heades, of some bones, whereby, they are together more strongly holden: as playnly appeareth in the Articulation of the thighe with the hippe, and agayne betwene the legge and the thighe: neither other where to be found, but elsse with these, you number that Ligament, wherewith, the tooth of the second Vertebre of the necke, is knitte to the hinder part of the head. You shall not dread, to finde the examples of *Sysurosis* very playne, in the fleshy firmittynge of the teth in their Celles, by the gowmes: which fleshy from them remoued, they become not onely presently lose, but also not long enioyng their places. These are the true diuisions of the composition of Bones, which since I haue with competent beuittie touched, I will not any longer stand in admiration of *Carolus Stephanus*, who either rightly knew them not, or els doubtyng, for feare of reprehension, gaue place vnto others: since that noble Galen (who verifieth this saying *Non omnia possumus omnes*) was not a little receiued, in ascribing to *Synarthrosis*, these differences *Sutura*, *Gomphosis*, and *Harmonia*, with other like poyntes, whereat (notwithstanding) no man ought to grudge, if such a one as rectified the whole Arte of Medicine, should in some poyntes, shew a little imbecillitie. But now to our purpose: it is tyme we approche to the singular description of Bones: which, this well noted that we haue hitherto sayd, you shall in readyng, far more easilie vnderstand. But first, if in the reason and names of the composition of bones, hether to so copiously handled, you be not sufficiently instructed, or fully satisfied, it shall not be amisse, that now and then, you helpe your selfe with this Table following.

D.I.

The



Examples of the Ligament Synneurosis, passing out of the head of a bone.

The example of Symplysis.

Carolus Stephanus hath erred in the composition of Bones.

What man is so wise as that in any thing hee sheweth no imbecillitie.

The Bones of mans body are compounded together.

By Toyne, which is a composition of Bones with moving, whereof be two differences:

By Symphysis, which is a joining together of the bones without moving, and is divided in three:

Videl.

*Diarthrosis*, which is a knitting together of bones to some manifest moving, and is divided into

*Enarthrosis*, *Arthrodia*, *Ginglymus*.

*Enarthrosis* is, where a rounde or long head is inserted within some cavitie answerable to it; as is the Articulation of the thighe, with the hip. *Arthrodia* is, where a place beyng lightly hollow, & that in the enter part, admitteth a little pressed head, as the first Vertebre with the second, & radius cum cubito.

*Ginglymus* is that, where in the Bones doe enter mutually one into another, that is, both receive, and are received: as the cubite with the shoulder bone, & thighe with the legge, and the second and third ioyntes of the fingers.

*Synarthrosis*, which is a Coarticulatio, or obscure moving, beyng divided into the same Species, or parts, as *Diarthrosis* is Videl.

*Enarthrosis*, *Arthrodia*, *Ginglymus*.

In that onely they differ among them selves, these having but obscure, those manifest motion.

Neither is it any manuaile, that the same thynges, being diversly considered, may under divers kynds in the same Predicament be placed, for it falleth out sometyne in divers Predicamentes. Examples in this kynde are these. of:

*Enarthrosis*, the Bone *Talus* with the botelike bone, and the thyrd Bone of the wrist, with the first, and second of the same.

Of *Arthrodia*, the Bones of *Tarsus* among them selves, *Cyboides* with the haele bone, and certain Bones of the wrist among them selves.

Of *Ginglymus*, *Talus* with the haele Bone, & some likewise of the wrist Bones among them selves.

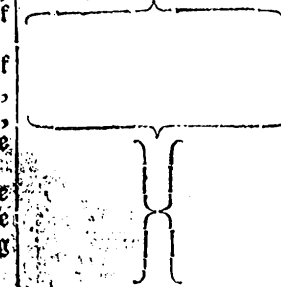
*Sutura*, *Gomphosis*, *Harmonia*.

*Sutura* is that manner of composition, sene in the head, wherein the bones are committed together & lyke the teeth of a sawe, as is

*Sutura* { *Coronalis*, *Sagittalis*, *Labdoides*.

*Gomphosis* is, where one bone lyke a nagle is fastened w in another, as the teeth in the iawes.

*Harmonia* is a joining together of bones by some simple line, as the Commissures of the upper iaw, & that chiefly, which is in the nose, and runneth after the longitude of the palate.



All these are committed together by

*Synchondrosis*,

Which is an union of the bones made by a Cartilage: as is sene in *Os Pubis*, the breast bone, and *Ilium*, where it is knit to *Sacrum*.

*Syssarcoesis*,

Which is a continuation of bones by the apposition of the flesh coming upon the, as is sene between the teeth & iawes, as also in those ioints, which Muscles do environ.

*Syndesmosis*,

Which is a composition of Bones by the meanes of a Ligament, as in the ioints appareth.

Now

Now saying that the head of all the other partes of the body is most noble, containing in his cavities the braine, which (cleane contrary to Aristotle's mynde) we proue the principall member of all others: we will first begyn with the Bones thereof: which to the braine, in their construction, are so safe a muniment, as it is small thanks to say nature was most carefull in constituting of it. And in this point by the motion of Galen, we are constrained to put forth a question: that is, whether the head was made for cause of the eyes, or els of the braine. To this the sayd Galen answereth in his viij. booke *De usu partium*, that the head for the eyes sake was so aptly ordained: so which opinion he was slenderly styred, by beholding the eyes of certaine creatures, called Betles, Cankers, & such other, which having no heades, to the end their eyes might possesse the highest rowme, for the best prospect sake, nature hath limited them certaine Processe, to usurpe the offices of an head. But, by the leave of so famous a philosopher, you shall heare the opinion of a latter practitioner *Realdis Collumbus*: who denyeth not Galen's opinion in this respect, that for great consideration, and requisite causes, the eyes must worthily in the highest place be constitute, and therefore the head to be a most necessary seate unto them, in whose proper angles they are peaceably retained, and strongly munited from all externe and accidentall injuries: but therefore, and for such onely uses, he graunteth not the head to have bene made of such quantitie, neither of that figure, nor such a construction of Bones, but rather for cause of the braine. For if the eyes should be the cause, (sayth he) could not nature have divided the head into two prominent Processe, in which the eyes might be placed to discern a farre of? Yes truly, and to have made them after a harder kynde of constitution: as appeareth both in those creatures that Galen nameth, as also in many other: the eyes of which creatures, if the creator had decreed to be of the like soft substance that the eyes of man are, then he would also have prepared lyke muniments, and defences for them, to save them after the same manner, from outward inconveniencies. And surely his reasons are pithie in this respect, to dissuade us from Galen's opinion: and rather to beleue, that the head was made, especially of that shape, and figure, for the cause of the braine: so much the more safely to keepe and defend it, beyng the habitation of reason: which maketh man to be accepted the deivine creature: which is the mistresse of all vertues, & Quene of animall faculties: whereon that the senses, continually as ministers, and servauntes, attendantly should wayte, in the same head also they obtaine every one their seates, as is not improperly declared in their places.

As touching the naturall figure of the head, called of the Grecians κεφαλή, Galen sayth it should be round long wise, on eche side lightly compressed, so that the fore part and hinder part be eminent, or out stretchyng. For as *Cerebellum* (towards the hinder part) lyeth under the braine, and the spinall maree thence stydeth from the head: so contrarily, Processe arise from the fore part to the eyes, & to the instrumentes of smelling. And therefore this he accompteth the naturall figure of the braine, and so consequently of the head. All other sortes he indgeth rather vnto the naturall: of the chiefest, or most notable of them, he hath made a fourfold division. The first of which is quite contrary to that we have nominated naturall, wanting both Eminences of the head: that is the former & hinder out goyng: so that in deede is exquisitely round like a Sphere. Of like sort, as Homer reporteth one Thersites to have had: which figure, as it is cleane contrary to the naturall fashion, so it is a token of vnaptnesse, and folly, having thereby the function of all vertues hindered, notwithstanding, all (for the most part) endowed with a sharpe or acuminate figure of the head, the Grecians call *οξύκεφαλος*. So Pericles, who, his head (as Quintilian writeth) being more long, and acuminate, seemed not to speake, or in any thyng to entreat familiarly, but rather

why the Anathorine of the head becometh first, & the braine is the principall member of the body, contrary to Aristotle. A question, where the head be for cause of the eyes, or of the braine. Galen's opinion, the head to be made for the eyes.

Lib. x. cap. 5. The signification of Galen.

Collumbus p. 10. not rather the head to be made for cause of the braine.

A sharpe reason, in that the eyes of Cankers are hard.

Why for cause of the braine the head was created. Reason in the Quene of all vertues.

Cap. x. de obs. lib. 9. VI. part. cap. 17. & 11. Aris Medicæ The naturall figure of the head. Lib. 9. de v. part. cap. 17.

The first of the four figures of the head not naturall.

Iliad. 8. Thersites.

Lib. 1. cap. 17. Pericles.



rather to thzone & thunder out his wordes. And this, little agreeable to the right measure of the head, the Atticall Poetes haue named *χυροκεφαλος* & *σχινοκεφαλος*.

The second figure of the head not naturall, is that, that in the forehead hath no eminence, but onely in the hinder part.

The third, is iust contrary vnto this.

The fourth figure is this, when both the sides of the head are more prominent, then either the forehead, or hinder part. But this kynde is so rare, as that it is not onely accopted not naturall, but playne monstrous also, and agaynst nature. Wherfore Galen sayth, it is altogether to the life of man vnprofitable: and that such, beside their shape, haue nothing that is proper to men. To this witnesseth *Andreas Vesalius*, who in Venice, beheld a boye, that beyng mad, besides many other strange deformities of diuers members, and partes, had also this figure of the head. Wherfore it seemeth, Galen rightly iudged of this fourth shape, and figure of the head, whence reason is farre absent, not seemyng to knowe such monstrous kyndes of shapes: but is delited best in the most naturall, and the further off from that, the more distant also from her perfection.

But to our purpose, and that whiche is more requisite. The Bones of the Head are neither altogether Solid, nor yet wholly fungie, rare, or like y<sup>e</sup> Pumith stone: for that were to light & frayle, subiect to manifold iniuries, and the other ouer heauy, and to much (more then nature would) oppressive. Neither would the substance of such, be any thing so transpirable as were in that case expedient. For the head is as a certaine coueryng, put aboue a vessell that boyleth vnder, neth it: so the brayne within it, is enuironed close as a hotehouse. But so, as if it should not haue passage out, after a certaine transpirative manner (since to the brayne many vapors and excrementes are continually ascendent) no man could endure, without great discommodities of health, and incommodious lyfe. Wherfore prudent nature willyng, that as the brayne had oft occasion, so it should neuer want, the meane of recrementall purgynge. And for that cause, was the head, not made of one whole and continuall bone, but of diuers, for the procreation of Sutures, or Seames: which nature, for the behoofe of the brayne, decreed so commodious. And this reason copelleth vs to subscribe vnto, though to the great reproch of *Cornelius Celsus*, who affirmeth, or rather dreameth that the head, altogether wanting Sutures, is most safe, & the fewer Sutures that it hath, the more commodious also to the health therof: for surely he hath nothing that maketh of his side, to induce this opinion, except he deceiued himselfe by to much regarding outward causes. But besides that, *Hipocrates Lib. de homine* hath testified agaynst *Celsus* in these wordes: *Saniores capitis sunt, qui plures Saturas habent*: and that Galen, in sundry places, commendeth the construction of the head made with Sutures. I thinke it good also to declare vnto you the Assertions of *Regaldus Columbus*, in this respect, a man, in matters Anathomicall, not meanly experienced. Who once, hauing brought vnto him a certaine young man, whom death, by continuall tormentes of the head, remediless, and in spite of Physickes ayde, had seased one found by Dissection, that through out his head, scarce the tract of one Suture could be obserued, but rather, as the head had bene of one Solid, & entier Bone, so that in the end, by the due obseruation of the Dissected parts of that man, the whole multitude that were with him (as it were with him one mouth) gaue sentence, that his continuall cruciable payne, and capitall dolour, was engendred of no other cause, but the streite composition of the Bones of the head, through which no passage could be procured: whereby those grosse, and vaporous fumosities (which other wise by the seamy Commissures, would transpirately euaporate) being in such retentive sorte included and findyng no passage to regurgitate the superfluities, were not onely the originall causes of his perpetuall dolour,

and

and animall veration, but also in fine inferred death. And this not once, but often tymes he ratified by experience, both in men and women, as one, in this poynt, greatly desirous to be satisfied. Wherfore it is marueilous, that so great a man, and learned as *Celsus*, could so much as thinke that, which he hath in this poynt playnly published: whereas he onely respectyng externe daungers, we can proue, that the inner ought more to be feared: that is to say, the fuliginous recrements, inwardly ascendyng without any transpirative vent, to procure more eminent, and irreuerable perils, then outward percussions: except such, as (were the skull all one bone) would finish the lyfe. So that we must needs deny his whole reason: that is to say, both that the brayne is more safe, by the inseparable coagmentation of the Bones, or healthfull, by their Soliditie. For therfore the head, beyng thus of bonny substance, whiche by the violence of some stroke might be fractured, or confused, it behooueth to be rather contrued of diuers bones, to the end, that when one part, by some such outward iniury, is broken, the other parts (notwithstandyng) might wholly be reserved: since in the head one stroke, can not reach very far beyond the endes, or borders of the part percussed: which would otherwise (no doubt) fall forth, were the head of one sole bone constituted. As for familiar example, strike a vessell made of earth or stone, so that it be of comparable thickness, and you shall commonly see, that by breaking one place, you shall commit the rest also to peeces, Wherfore not iniuriously, or vayne, is the healthfull head distinct with Sutures, or seames: for as them, to transmit the fumous recrementes of the brayne, this is not the onely benefit: but their apt construction also is the cause, that outward percussions, making breach in one part, to do the like in another, are aptly prohibited, except the stroke (as I sayd) be exceedingly greuous. But besides all this, I hope, when I haue reuealed vnto you a third commoditie, appertaynyng to the Sutures, you will metely be satisfied, as well as I. For vnto them is Appendant the Membran of the brayne called *Crasa Membr.* or *Dura mater*, which, as shalbe sayd hereafter more largely, beyng effused by Fiberlike tyng through the same seames, doth engendze on the outside of the scalpe, an other Membran, which involutio is ordained, for the Extrinsicall Obduction of the capitall Bones: and this coueryng is called *περιεγκεναιον*. But some perhaps will here obiect, and say, that they haue found in aged persons, the skull destitute of Sutures, yet they liuyng, were not vexed with paynes of the head: I answer, that likewise in men or women, that haue liued many yeares, neither will the Appendances of their Bones be separated: though in persons sufficientely young, they be most manifest: but marvaile not at that, since extreme youth, or extreme age, in Anathomicall affaires are not to be obserued: or at lest to excite any controuersie in Arguments. For certaine partes of infantes, till after a competent space of tyme, are by the tendernesse likeliest to Cartilages: yet no man is so senselesse, to deny there beyng bones. But let vs draw nearer to the matter.

By appellation of this name Head, vnderstand you the hypper part and topp of the body, created for the cause of the eyes, and brayne: whose proper figure should be round and long, after the similitude of a long Sphere: on both sides depressed, beyng by the name distinguished from either of the iawes: that is, some tyme called the Skull, some tyme the Scalpe, contrued woorthely of diuers bones, and those, both within and without, hauing a smoth crust, and hard face, but in the midst fungous, and like a Pumice stone. Further, these bones are perforated, here, and there, vnderly, with a sort of smal holes, to the end, that by them, the little Tendinges or Spiggie branches of veines, and Arteries, which bryng bloud for nourishment, and spirite for the increase of heate, and conseruation of lyfe, might haue pleasant passage. And therfore be the bones of the head, betwene the outmost, and inner scales, cauerneous, or hollow: not onely thereby, to become

And,

more

*Columbus* in this poynte satisfied him selfe both in men and women, findyng in them that were much given to paynes in the head, the Sutures to be growen by. Where *Celsus* dyd most respect outward daungers, when as in deede the inner are more to be feared.

A notable reason agaynst *Celsus* why the bone of head is deuided.

A familiar exaple

In briefe the reasons, why y<sup>e</sup> head hath Sutures. The first reason. The second vent.

The third reason.

*Dura mater*, goyng forth by y<sup>e</sup> seames, begeth *Pericranium*, to couer also the outside of the skull.

It is not the object of aged persons that can cause this reason. Extreme age or extreme youth is not to be obserued in the Anathomicall.

As in children some partes of bones through softnesse seeme Cartilages: so in some aged persons the Seames of the head are done away.

What signifieth the head. The vnder of the head.

The figure of the head. Why the bones of the skull are peaced with many little holes. Why the middle part of the bones of the skull are fungous.

The second figure not naturall. The third figure not naturall. The fourth figure not naturall. The fourth figure not naturall, is rare & monstrous.

*Lib. 1. ca. 5.* *Vesalius* maketh mention of a boy that was mad, vnto this fourth figure of y<sup>e</sup> head. The further off from the naturall figure, the further also from the perfection of reason. What kynde of bones are to the head. Why the Bones of the head were not fungie. Why the bones of the head were not made altogether Solid. The making of the head to a pot compared.

Wherfore y<sup>e</sup> head is distinguished with Sutures.

*Lib. 8. ca. 1.*

*Lib. 1. ca. 5.* A young man, who dyng through payne of his head, had no Sutures in the skull conspicuous.

The two walles  
of the skull.  
The tables of the  
bones of the head,  
whiche are be-  
tweene them the  
fingrous sub-  
stance.

What are called  
the Sutures.  
The knowledge  
of the Sutures  
is expedient in the  
explication of the  
bones of the head.  
The number of the  
Sutures.  
The nature of the  
Sutures are Har-  
monia.  
The number of  
the Sutures.  
Loc. Citat.  
The description of  
the Sutures called  
Lambdoides.  
The description  
and use of the Co-  
ronall Suture.

The names, des-  
cription, and use  
of the Coronall  
Suture.

The Sagittal  
Suture sometime  
cometh downe  
through the middle  
of the frontis.  
Fuch. lib. cap. 8.  
That the descen-  
se of the Sagittal  
Suture maketh  
no difference be-  
tweene the scalpe  
of man or woman.  
The descen-  
se of the Sagittal  
Suture is not com-  
mon in man or  
woman.  
Col. lib. d.

That a dogges  
head is disting-  
lished with Sutures,  
against Aristotle.  
The description of  
the Seames of the  
skull bones of the  
temples.  
The joining of the  
skull bones by fa-  
miliar examples.  
That part which  
lyeth without is  
harder then that  
whiche lyeth  
under it.

more light, but also to containe medullous substance for their food and nourishment. This Punicous substance, intersited betwene the sayd scales, or crustes, is the cause that some haue sayd, the skull to be condited and made of two walles, which they call Tables: meaning those y. crustes, or scales, which beyng hard, and therewith a litle thicke, do shut in on eche side that sayd Spongius & medullous substance. These bones are seingated on eche side, in their endes and borders, obteinyng in all such places, by generall appellation of the Anathomistes, Sutures, or Seames: of which, here is so much to be spoken, because they are expedient in the explication of the bones of the head.

Now therfore of seames, some be true, some false, which being rather in dede Commissures, are more to be referred to *Harmonia*, then *Sutura*. But to recount vnto you by one intier & direct number, how many Sutures there are in the head, *Realdus Columbus* sayth vij. if all be accompted, wherof v. be false, and improper: and iij. proper, and true. Of the true, one is, that in the hinder part of the head, & in the foundation therof, where, it goeth on both sides towardes the eare, the going vp of which in the begynnyng, is broad, but higher and hygher ascending, becommeth narrower, like the fashion of this Greake letter  $\Lambda$ , for which cause it hath long tyme, and still doth retaine the name accordyngly, that is,  $\Lambda$ mbdoides: this denubeth the Bones of the temples and Sinciput, from the bone of hinder part, or Occiput. An other, is in the foremost part of the head, compassing the forehead like a kynde of halfe circle, and is called by the name of the place *separativa*, in Latin *Coronalis*: this separateth likewise the Bones of Sinciput, from *Os frontis*.

The thyrde Suture is that, that runneth straight on the top of the head, distinguish-  
ing the right, from the left side of the head: & for asmuch as it lyeth straight lengthwise on the head, from *Lambdoides*, to *Coronalis*, it is nominated of the Greecian  $\delta$ βελαια, the Latins *Sagittalis*, or *Recta Sutura*. And this Suture is sometye, sene (though some Anathomistes haue seemed doubtfull to pronounce it) to augment his cruite, down to the neither part of the forehead, and toppe of the nose: which I am not onely moued to affirme by the probability of some approued authoys, but dare safely also auouch it, by that experience my selfe hath tasted. But that princely Peripatetician Aristotle, was much deceiued, in making a difference betwixt the heades of men, and women: when as in dede that way, there is no kynde of difference, but rather mutually in the selues, diuersified. Therefore that rule is not to be obserued, though others sence his tyme haue not slackt to say, that this *Sagittalis Sutura*, descendeth to the nose in women, but not in men: or contrariwise: for both is false, since in either it may be found. Although in dede (as it is) very rare, or seloome. So lesse is the opinion, of the same Philosopher dissuant from truth, in that he saith, that the head of a dogge is continuall and without Sutures, whereas diligence shall finde it most directly distinguished with Sutures: & those, more elegant then in men.

There are besides, two seames sited after the bended length of the head, equally distant from the Sagittal seame: these are caried aboue the eares, from the extremitie of the descendēt *Coronalis*, with a certaine circular walke, and in some reache downe to the lowest seat of *Lambdoides*, in others agayne, not passing *Millares*. These y. seames, that is to say, on both sides one, beyng as skalle bones, and conglutinate, or layd on like scales, are accordyngly called skalle bones: the thinner part of one, lyng to the thicker part of an other: and so by due proportio, ioyned together: like as in a mybe coniectured, by the sight of Fishes scales, or the yron plates of a iacke, one lyng on an other. And note, that of them, the outmost is much harder then the inner: because it lyeth aloft, and therfore nature ordaineth it as a defence for the other. These are the lineall coagmentations of the two scales,

scales, that keepe the compressed sides of the head, bozdyng vpon the other bones, or on their endes Superiacent: but because their knittynge is not Suture like, that is, one mutually let into an other, like the teeth of two sawes ioyned together, and as the above mentioned are, they are called therfore of the Greeces  $\Lambda$ πλο δὴ προσκολληματα. That is, skalle Conglutinations. Galen hath named them *χροαρία*, or temporall Sutures. And for that these bones do represent scales, to the sides of other bones (to make by the inclosure) adherent, they haue no other nomination than, *Ossa squamosa*. These fine are proper to the head.

Then the vi. is that, which from the extremitie of *Lambdoides*, is deduced through the middle of the stone or hard Bones, stretchyng forth with to the foundation of the head, where it meeteth with the first Vertebre, or turnyng ioyn: and this part, Galen calleth additions of *Sutura Lambdoides*. From thence agayne begynnyng, vppwardes on both sides, it creepeth to the hollowes of the temples, euen to the endes of *Coronalis*: whence reflected downwardes, to the extreme teeth, and palate, it is common both to the head, and vpper iaw: and comprehendeth in it the whole bone called *Cuneale*.

The vij. denubeth the bone of the head, that is numbred the vij. from *Os frontis*, separatyng it wholly from all the partes therof.

The vij. & last Suture begynneth at the hollowes of the temples, where the vi. is reflected, & begynneth to descend, & creepeth through the middle regio of the lesser corner of the eye, as also through the middle of the eyes roundell, thence tranuersly speedeth to the toppe of the nose, & so seuereth the vpper iaw from the forehead: but in the inside of the head, nere the foundation or seate, *Os cuneale* distoyneth it selfe from *Os frontis*. And thus much you haue to consider of the Sutures, as touchyng that, that appertaineth to the outward view of them. For within, at all appeareth the shew of no Sutures, but rather *Harmonia*.

Galen maketh relatio, how in heades, varyng from the naturall figure, diuersitie among the Sutures likewise shalbe found. Which *Realdus Columbus* denpeth, as also the not natural fashions of the head: although some be more, or lesse compressed, or backward, & forwarde prominent, yet (sayth he) all are of naturall forme and fashion, and the bones, with Sutures all, to be numbred: though somewhat, by the places and greatnes, discrepant. But whether it be so or no, or whether the diuerse figure of the head (not beyng monstrous) shew shorter, or longer Sutures, or more crooked, lower, or hygher, lofer, or more compact: it is but folleie vs to stand in doubt of, or dismay our selues, or to detract the tyme with longer discourse. For lightly, in any of them, you shall finde some mention made of the rehearsed sort. And we accompt it sufficient, that our description, be consentyng to the veritie of the thyng.

Aspert these viij. Sutures, remaineth the Bones, constituting the head, to be described. Which Galen numbreth somewhere five, other where vij. but *Vesalius*, & *Columbus*, both with one consent (as it were one subscribing to an other) haue inuented vij. thus accomptyng. Two of the fore part, called *Sinciput*, or *Bregma*: this *Bregma*, is to be vnderstande the vpper part of the head forward, nigh to the Coronall Suture. It is the place, that in infants, and late boyne sucklynges, is so soft, and tender, that vnder it, both *Sisole*, and *Diastole* of the bryayne, most euident, and with pleasaunt perspicuities (so that no man needeth to doubt of the contraction and dilatation that the bryayne obtaineth during lyfe) is to be discerned, notwithstanding that by litle, and litle, dayly more, and more, it becommeth intract of tyme, sufficient hard, and bonny: yet woundes therein are noted deadely. And to certifie you of these Bones of *Bregma*, or *Sinciput* more playnly, those are they, which close their Suture betwene *Lambdoides*, and *Coronalis*, cuttyng out the space betwene them: whose seame is called *Sagittalis*. From either side of the same

Fuch. lib. r. cap. 8.  
Where these are  
called temporall  
Sutures.  
Why these bones  
are called Squa-  
mosus or scale.

The description of  
the vi. Suture.  
Additions of the  
Sutura Lambdoi-  
des.

Where the sixe  
Seame is com-  
mon both to the head  
and vpper iaw.

The description of  
the vij. Suture.

The description of  
the vij. Suture.

The Sutures are  
without conspi-  
cuous, but within  
scarce appeare.

Lib. 9. v. part. cap.  
17.  
Lib. de ossib. cap. x.  
Lib. cap. 5.  
The diuers figure  
of the head  
varyeth not the  
number of Sutures.  
The differences  
of Sutures.

Lib. x. de ossib. ca. x.  
Lib. xi. de vi. part.  
Bones of the  
head.

Columbus ibidem  
vt sup.

In the part of the  
head called Breg-  
ma in childre, the  
contraction, and  
dilatation of the  
bryayne called Si-  
sole, & Diastole,  
is playnly percei-  
ued.  
Woundes in  
Bregma are dead-  
ly.  
The vpper seame  
of these bones of  
Sinciput, is the  
Sagittal Suture.



# The first Booke of the

*Sutura Sagittalis*, where they mutually coagmentate, they descend equally to the uniting of the scalle bones. Wherefore, considering their situation on eche side, you shall finde them fashioned after a quadrangular, or sower square manner, thus hemmed in on eche side: in their upper partes with the straight or Sagittall line: in the foreside with the Coronall: behynd with *Labdoides*, and beneath with the scalle conglutinations.

The third bone is called *Occiput*, ending at the Labdall Suture: besides that in the foundation of the head, it is disioyned from *Os Sphenoidis* by the first Suture, overthwartly chauncing: And this bone is made of vnequall partes: that is, in some places thicker, then agayne in others thinner, but in the middelt of the seate or ground thickest of all. Neither not elegantly hath nature erected a Prominence, fro that hole, whereby by wayne is deriued into the spinall marcy, which bywardes ascendeth to the toppe of the same bone: thereby to make it more able, and strong, for so nature carefully impendeth her study, in the whole construction of mans body, her notable worke, that as the partes incident to small daunger, haue little wherewith to defend them selues, so such as are sited in most eminent perilles, and as it were in the forefront of irrepugnable damages, those commonly are armed with double shielded defences. As we see, a man, in falling forwards, hath his hands to stay or beare him by, but backwardes, goeth prone, ly, without all hope of recouerable stay, till the hinder part of the head feele the waight of his body. Judge then (since this is most true, as what soeuer is truest) how farre good Aristotle was deceiued, that would needs, haue this bone of the hinder part of the head, to be, of all others, most weake, and thinn. But to come agayne to our matter. The other partes of this bone, beside that Prominent place spoken of, are but litle in deede, or of small volume: but those also sufficiently thicke, and solid, neither boyde of flesh, but safely couered with Muscles, occupying the hinder part of the necke: and on this bone resteth *Cerebellum*; neither otherwhere is empty, though it pleased so great a Philosopher so to affirme. Besides this, to demonstrate precisely the circumscription of this same bone *Occiput*, it seemeth to be forged with fise sides, notwithstanding the authoritie of such as write but thre. Among which, the two first begyn at the neither part of the Labdall Suture, nere to the bones of the temples, and so ascending with the same Scame of either side, narrower, & narrower, till it haue touched the point of *Labdoides*, where these two sides meete. Two other, fro the hie of the same Suture, stretch forth after *Os mamillare*, and downwardes, till they come to the line or Suture that seuereth *Occiput* from *Sphenoidis*: by benefite of which transuerse deduction of the same Suture, is necessarily made the v. side to *Occiput*. But this note, that as this bone in the hinder part of the head, in persons of strengthened yeares, is all one, and vndeuided: so in young childre, into foure or fise partes, yea some tyme into vy. distinguished. Beyond all this, this bone hath in it, the most notable hole of all the bones of the head, made for the going forth of the spinall marcy: In which hole, appeareth foure seperations, or diuisions, so that it seemeth to be deuided into foure partes: from amog whose spaces floweth a Cartilage, which, after the manner of a Ligament, connecteth the head to the first and second Vertebre, whereby the same, beyng of so great quantitie and waight, might more firmly be bound and obligated, to those smal bones and turning ioyntes of the necke: of which Ligamentes, we haue entreated more abundantly otherwhere. Finally, this is to be noted, from the sides of this hole procede two swellings, or prominent portions, which are couered with a Cartilage, being vnto them as a crust: wherfore they are not sharpe, but made so for the purpose, to be let into the cavitie of the first Vertebre, for the better constituting of the head his articulation.

The fourth bone is *Os frontis* which is simply and onely one (vnlesse it be other

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therwise in such Scalpes, as haue the Sagittall Suture descending down to the toppe of the nose, which (I say) is seldome found. Wherefore, this we call by Circumscription of *Os frontis*, when it is found one and vndeuided. First, it is sepe- rate from the bones of the fore part, or *Sinciput*, by the Coronall Suture: Next, from the Cuneall bone, by the vj. Suture: Thirdly, seuered by the vij. Suture, from the vij. bone of the head: Lastly from the Cuneall bone, as also fro the upper iawe, by the interfection of that Scame, which rising from the hollowes of the temples, pearseth, through the middle seates of the eyes, euen to the toppe of the nose: where the eye browes end. This bone of the forehead is (after a certaine manner) round, and no where so thinn, as where it constituteth the upper region of the holes of the eyes, and meeteth with the vij. bone of the head. But this note that I will tell you, which Galen (as farre as I haue read) neuer made mention of. About the toppe of the nose, where the same is committed to *Os frontis*, this bone of the forehead holloweth it selfe, on eche side, both where it maketh the upper region of the eyes, as also prominently constituteth the browes, and seemeth, as if it were lined with a thinn scale: betwene which, and the outer Solid side of *Os frontis*, these cavitie runne, after the manner of this figure) (, to the containing of ayze, as *Vesalius*, and *Collumbus* haue imagined. Wherby it appeareth, in this place, to be, by reason of such celles, most thicke: but yet in the space above, and betwene them, it is most Solid, thicke, & firme, as also more infirm, thinn, and weake, where it is committed to the Sagittall Suture, & upper bones of the head: because there it is in infantis Membraneous, as before is spoken of that portion of *Sinciput*, that bordereth vpon the Coronall Suture.

After this, follow the bones of the temples, which, in their upper part, that is towards the Sagittall Suture, are equally circumscribed with scalle Agglutinations. But behynd, with the partes or additions of the Suture *Labdoidis*, and with the vij. Scame, which seuereth their lower partes from *Sphenoidis*, and seuereth their Anterior part from the upper iawe, and on *Os frontis* bordered. These bones (whosoever sayth the contrary, as Galen that accepted them iij. square) are notwithstanding most properly to be termed Circular, or Round compassed, for so they shew most in the Superior part. Onely their fourme is obscured by many Processes. The first of which, are the Mamillar Processes, dependent like vnto the broken browes of bankes, hanging downe, but beare their names for representing the fashion of Tetes in a Cowes boddy, called therfore of the Grecians *Μασοειδης*; which processes serue not onely to the insertio of Muscles, but that in them also might be contained most excellently, a large cavitie, to the Organ of hearing exceeding necessary. Wherfore you shall euer finde it boyde and empty, running in with diuers caues, and priuy corners. Howeuer not farre fro this, busteth forth, from the foundations of these two bones, two other processes notable, which are not onely very small, but also long, and hard, endewed with many names, for the diuers kindes of shapes, whereto they are likened. As *Βελονοειδης* after the Image of a needle: others, for the similitude of a waiting Tables pine, haue named it *γυαφοειδης*, or *σολοειδης*, or, for the likeness of a Cockes spur (which in my opinion is of all rest nearest vnto the marke) *παλινκτορ*, although *Styloides* most of all is vsed. And these stiliforme, or spurlike processes are prominent next vnder *Mamillares*, stretching obliquely forwarde, & pointing as it were to the Anterior relectio of the neither iawe, where it is called the Chinne. The third Process of the temporall bone maketh a portion of *Os ingale*, wrapping out crakedly, fro the neither part of *Temporale*, where it maketh somewhat a slender reflection, the more aptly to mete with the iugall bone. And more then these *Vesalius* neuer remembered. But *Realdus Collumbus*, a famous man to be remembered, who, in these matters Anathomically by his exploatiue indagation, seemeth

*Os frontis* is a simple bone. When *Os frontis* is two. The circumscription of *Os frontis*.

where *Os frontis* is most thinn.

A large cavitie above the eye browes in *Os frontis* which Galen knew not.

The use of the cavitie in *Os frontis*. Cap. 6. Why the bone of the forehead is towards the Sagittall Suture thinner. The bones of the temples.

The figure of the temporall bones.

The Etymologie of the Mamillar Process.

The best of the Mamillar Process. The Mamillar Process is hollow, and why. The Process called *Styloides*.

This Process hath diuers names, as *Βελονοειδης*, *Γυαφοειδης*, *Σολοειδης*, *Παλινκτορ*, *Styloides* and *Plectron*.

The manner of the spirith Process. The description of the third Process of the temporall bone. Loco Citato. The commenteth the industrie of *Realdus Collumbus*.

The description of these two bones of *Bregma* or *Sinciput*.

The circumscription of *Occiput*.

Why a Prominence in *Occiput* is made. Why a Prominence underhand, what portion of the bone is most notably situated in the place: and this I will tell you, which Galen (as farre as I haue read) neuer made mention of. About the toppe of the nose, where the same is committed to *Os frontis*, this bone of the forehead holloweth it selfe, on eche side, both where it maketh the upper region of the eyes, as also prominently constituteth the browes, and seemeth, as if it were lined with a thinn scale: betwene which, and the outer Solid side of *Os frontis*, these cavitie runne, after the manner of this figure) (, to the containing of ayze, as *Vesalius*, and *Collumbus* haue imagined. Wherby it appeareth, in this place, to be, by reason of such celles, most thicke: but yet in the space above, and betwene them, it is most Solid, thicke, & firme, as also more infirm, thinn, and weake, where it is committed to the Sagittall Suture, & upper bones of the head: because there it is in infantis Membraneous, as before is spoken of that portion of *Sinciput*, that bordereth vpon the Coronall Suture.

Why the bone of the hinder part of the head is thinned. The opinion of Aristotle is refuted who affirmeth the bone of *Occiput* to be thinned.

The weaker partes of this bone are strengthened by the Muscles of the necke. Col. Lib. 1. ca. 5. Aristotle falsly imagined the hinder part of the head to be empty. *Occiput* consisteth of five sides, Galen sayth but thre. The description of the sides of *Occiput*.

Note. *Occiput* in childre doth consist of some tyme of vj. bone. The vntite of the deuided *Occiput* childre.

Two Prominent partes in *Occiput* their fourme, and why they were so made.

The fourth process of the temporal bone.

A more plain explication of the third process.

The cause why it is neither suture nor articulation.

Why the Greeks call these bones Ichoide.

The prouidence of nature in creating the temporal bones.

The fourth bone of the head called the Cuneal bone. What is called Basillare.

The description of this Cuneal bone or Sphenoides.

The bone or cause of Sphenoides.

A new opinion of the Animal spirits.

Cap. supra. The Cell in Sphenoides. The Glandule receiving the regimine.

The processes of the Cuneal bone called Pterygoide. Whence spring the Muscles that shut the mouth.

The destination of the big bone of the head.

seemeth to haue sifted a mite, and clouen a heare, hath not so let slippe, or winced at the fourth processe, which beginning nere vnto the rote of the stiliformed, swelleth out long into the inner part of the head, in the which is made that noble Labyrinth, resonant to the reflecting ayre of euery noyse: which we will hereafter, with more requisite propriety, deuyffe. But to make the third processe recited, better knowne, and more manifest to your intellection, you shall note, that when it riseth from the *Anterior* part of the Organ of hearing, it stretcheth not directly along by the sides of the temporall bone, but crooketh vp, toward the ingall bone, in Circular sorte, not vnlike the arche of a Bridge, vnder which, subentret, the hollow of the temples, and to the beginning of which processe, is the bone of the neither iaw Coarticulated. For vnder the rising of the processe, nere to the auditozie passage, is a cauitie, deeply incased with a Cartilage, wherunto is inserted, the longer processe of the neither iawe: And thus much of the processes, from the temporall bones, prominent. Which bones are, (towards their foundation, and lower partes) anfractuons, rough, and stony like, compared therfore to rough and stony banks, wherby they obtaine of the Greeks this name *Ichoide*, for the same cause. Contrariwise, aboue, and in their vpper partes, light, and most thinn, especially in such places as the temporall Muscles are spread: but, together with their thinnes, nature hath graunted them to be sufficiēt hard, so that (Without great perill of lyfe) they may not be broken.

The big bone of the head sheweth diuers fourmes and fashions, wherfore the Grecians thought good to call it *πολύμορφον*, as also *σφαινοειδές*, that is to say, *Oscineiforme*, or *Cuneale*: since that betwene the bones of the head, and vpper iawe, it is intruded like a wedge. The barbarous sort call it *Basillare*, because it substateth the bzyne, no otherwise then a ground or foundation thereto. For in the midst of the foundation or ground of the bzyne, it sitteth, compassed about with the big suture, which comprehendeth in it this whole bone: beside the fore part, where it endeth at the big Seame. But in the same seate it is thicke, continuing within it a hollow caue, which is all one with the cauitie of *Osc frontis*, in which we haue sayd the ayre is alone by the nostrils, to be retained, until it flyde from thence into this hollow place: the mater of which, helpeth the bzyne in feeding animal spirits, if *Columbus* his opinion newly inuēted, in that respect, be any thing credible, as will more at large hereafter, when we come to the animal History, appeare. This denne or hollow caue is large, and commonly vacant in all persons, though in some (perhappes) you shall see it replete with a certaine Spongie kynde of substance. The couer therof is a hard and thicke scale, which Galen likeneth to a searse, as though it were full of holes, to strayne the most matter of the bzyne: which *Columbus* utterly denyeth. But this note, that he sayth, in the midst of the inner part of the skull this bone hath a certaine proper Cell or corner, in which for the purpose, is a Glandule aptly sited to receiue the same humiditie, which thence afterward, maketh recourse vnto the Palate and nostrils, the wapes of which one, haue sufficiēt scope into the other, as shall be sayd. Moreover the sides of this bone, where it beholdeth the hollowes of the temples, haue two partes, inwardly hollow, but outwardly conuered, or imbossed. Finally in the outward part of this bone at the foundation of the skull where the teeth called Grinders are fastened, are foure processes, that is to say, on eche side two, spreading like vnto the winges of Bittes, called therfore by the Greeks name, *πτερυγοειδές*. In the midst of these processes is a deepe cauitie whereto arise the Muscles that serue to shut the mouth.

The eight bone of the head is placed about the middle of the foundation of *Osc frontis*, being fastened from the Cuneale bone, in the inner seat of the skull, by the big suture: but outwardly ending at the second and third bone of the vpper iawe.

the

And besides the hedge or diuision of the nostrils that it maketh, it stretcheth no lesse, to the constitution of the seate of the smelling Organs: for the which cause of smelling, it is diuersly distinct with many little holes, and of his owne substance thinn. Wherfore it is called *sphenoide*, for the liknes of the thynge, being a searse that it aptly representeth: by vertue of the which, since we naturally receiue the Facultie of smelling, we must gather thus the ground of our argument, that a man loseth the same, or at lest hath it dully, labouring in continuall destillations of the head, and Coriza. For thereby these holes are stopped, and the spirites deteyned, so that the fauour of nothyng can be conueyed in, or at lestwise, sensibly discerned and iudged. Galen sayth these holes are liker the celles of a sponge, because they are crooked: affirming that *Dura Membrana* is also accordingly perforated. Neither (sayth he) is it onely a seruant for the receipt of fauours, but also an officer, to vnbourden the bzyne of Egmaticke excrements. Which, neither could be auoyded through those holes, neither any vapour of smell ascend, vnlesse nature did puruey the same, both by inspiration, and expiration. For by the flying in and receipt of inspiration, is moued the dignitie of fauours, and agayne by the force of expiration, excretion of superfluities is made: the vehemencie of the spirites halping out with them the noysome excrements. In the middle region of this bone, goeth out a highe and thinn processe, separating that passage into two partes or sides, where the instrumentes of smelling are situated: which also into the nostrils descendyng, constituteth the hedge, or partition of the nose.

After this maner be the bones of the head naturally, & diuissibly conformed. But Galen thinketh not good to number this bone among the partes of the head, but of the nostrils: if *Fuchsius* coniecture, in explicating this hard and depraued place (as he termeth it) of Galen, *Εξέχεται δὲ τοῦτον ἵψον τῆς ὀφθ.* be acceptable. As they that be disposed to proue may read in the x. Chap. of his first booke.

But among the bones of the body, there are certaine destitute of proper descriptions & endes, which neuertheless are of the expert Anatomistes described, euen as though they were peculiar bones: neither not vnworthely among the number of the rest accounted. Of which sorte, is the bone called *ζυγαία*, *ζυγοειδές*, and *ζυγάδες*, in Latin *Iugale*: for as much as they are the partes of two bones, yoked together: being constituted of two processes: wherof the one springeth from the vpper iawe, vnder the small corner of the eye, and the other from that part of the temple bones, where the auditozie hole is sited. These two processes meeting after a superinflected maner, are conuerted and knit together by an oblique suture. And so fashioneth one bone, like vnto a yoke, or rather a bridge, as I sayd before. Which is (as it were) a propugnacle, decreed by nature for the safe lodging of the temporall Muscle. Wherfore by bounding by or heuyng outward, it maketh for the purpose a hollow passage vnderneath it, not being of it selfe soft to receiue iniurie lightly, but hard, strong, and almost solid, to repulse eche damage boldly. For yet altogether in it selfe destitute of hollownes. Wher in *Vesalius* is of *Columbus* repponed, for affirming the hollow portion of this bone to be voyde of marie altogether. And in giuing this repprehension to *Vesalius*, of necessitie he biteth Galen, who sayth, for as much as it moueth not, neither hath it neede by hollownes to be made lighter: but is strong, thicke, and solid, voyde of marie. *Leonardus Fuchsius* speaketh much of the great prouidence of nature vsed, in placing the temporall Muscle vnder this Iugall congmentation. For among all other Muscles, chiefly this (if it be hurt) causeth (sayth he) conuulsions, fevers, caros, & dosage, for the vicinitie of the bzyne, which onely the bone and membrans parteth, and of the originall production of sinewes, of whose Surcles, it enioyeth oft the sensibilitie, as in copious order shall hereafter be sayd.

C. ij.

Beyond

Why the big bone is full of holes. The bone Ichoide and why it is so called.

The reason why in disease called Coriza the seate of smelling is lost. Lib. 2. de Vi. part.

How the fauours are discerned.

How superfluities are purged.

How the hedge or partition in the nose is made.

Lib. 9. V. part.

Fuchsi Lib. x. cap. 10.

The Iugall bone is but a portion of the bones of the head and of the vpper iawe. Col. Lib. x. cap. 6.

The description of the Iugall bone.

The first destitute of the Iugall bone.

The Iugall bone wanteth not his marie, and therefore hath some hollownes. Galen Vi. part. 22.

Lib. x. cap. 8.

The dangers that ensue by the hurt of the temporall Muscles.

Why such dangers are their incident.

The second brittle of the Jugall bone.

Of the Offices of the Bones situated in the Organ of hearing. Given liue not these Offices. The number of these Offices. To those two which Vesalius inuented. Columbus hath added a third.

Where these Offices are found. The Offices of the organ of hearing are wrapped in Membran. The figure of the first Office.

The use of the head of the first Office. Wherefore the first Office is called a Mallet. Why the second Office is called a Stedie.

The description of the second Office.

The second is in figure like to one of the Grynders. The use of these two Offices in the Organ of hearing.

How hearing hapneth.

Cap. 7. The situation of the third Office of hearing inuented by Columbus.

The third Office is compared to a Stirrope.

Beyond all this, the Jugall bone was framed for a second use, and vtilitie. That from him might procede, and depend the manfousious, or catyng Muscles. As other where is noted.

But before we take in had to treat of the bones of the upper iawe, whilest yet opportunity is offered, let vs a little discourse of Ossicles, & little bones of the Auditorie organ. Of which, all the old writers before the tyme of Vesalius, were either ignorant, or els neglected to write. And of these little Bones, the later writers that haue inuented them, haue numbred two and of them onely made their descriptions. But Realdus Columbus, since that tyme, a man no lesse expert then learned, hath by his singular industry, and narrow search, found (as he reporteth) a third among the rest. Which thre orderly to decesser, consider that, among the bones of temples, there is a certaine proceffe (as I touched before) at the foundation of the bryne goyng forth, & extended after the manner of a beame, with a sharpe end, which is within hollow, like a caue or crooked Labyrinth, about the middle region wherof, are these Ossicles annexed to their Membrans. The way vnto them is by the Auditorie passage. Of which, the first that appeareth in the Interior part of the hole, is a little long one, not unlike the bone of the thigh, although in consideration of the end of the thigh, somewhat unlike: neither is the head thereof depressed, but sharpe poynted: this is of the one part. But in the other part, it hath a head long, and round. Furthermoze it hath two Proceffes, like those which in the thigh we call the Rotatorie Proceffes: the sharpe and slender part thereof, is fastened in a slender Membran, which reacheth both to it, and that likewise that followeth. The other part, which is thicker, and endelued with a head, serueth to shake the same Membran after the manner of a Tympan, as the authours terme it. Wherefore it is called a Mallet or Hammer: not for the likenes, but the office sake.

Euē as the other that followeth, they will attribute to the similitude of a steddy, or anueld, for that it serueth in like turne, receiuyng the motion or stroake (after a certaine strange order) of the Mallet lately declared. And this is the second Ossicle, called by the name of a steddy or anueld: beyng somewhat thicke in the upper part, which sheweth the playne part of a steddy, and endeth in two slender and sharpe Proceffes, as it were two legges: of the which, one is sent to the third bone, which Columbus hath added and not superstitiously inuented) beyng in the sayd Membran aboue recited, & to the other seruing, detained, and placed. This he compareth, for the likenes of the thyng, haryng two rotes, one longer and slenderer, an other thicker & shorter, to one of the teeth called Grynders: not deprauiyng it of the other name, for the office sake. Neither rashly hath nature ordained these y. bones or rather Ossicles, so in their thicker part to respect, & mete together. For whē by the motion of the ayre, hearing hapneth, the stroke thereof is brought in through the passage, to these little bones: by which agayne is made a certaine repercussio, to the discerning of the second that is made, by which meanes it is iudged. Wherefore it is requisite, that by the yielding of the Membran these bones should moue, and knocke together. As when the first bone, percussed by the stroke of the ayre, repercute the other in manner of a mallet: Wherefore the second that suffreth this, is endelued with the name, and office of a steddy: and where they are knit together, a cruellie Cartilage doth couer them.

The third, which onely Columbus mentioneth, lyeth in a certaine little Cell somewhat round, within the Auditorie cauitie. Wherefore it must needes also be appertinent to the Organ of hearing: it is both hollow, and also notably perforated, imitating the figure of a Stirrope: onely in this differyng, that it wanteth those holes, that Stirropes haue to be bound thereby to their saddles. But in stead thereof, it beareth out a certaine round head which appoacheth the proceffe of the bone

bone called the Stedie. Wherefore, when these little Offices among them selues are conioyned, and colligated after this manner, it is no case doubtfull, to denie them all seruiceable to the Organ of hearing. Neither is there any questiō to the contrary in that to be demanded. But this we must note, that whereas Vesalius affirmeth them, because of their likenes, Solid: Columbus contrariely, will haue them Concauous and hollow, accōdyng to their fashion in bignes, and litenes. That is, that they be inwardly Porie, or Spongie, containyng like their propozi- tion, a small quantitie of marey: especially the first y. but the third, for the exced- dyng tenuitie, to be Solid, he in no wise denyeth. If any man be desirous to obserue the administration of these Offices, we are taught to seuer the bones of the Auditorie passage lightly, and deuide or cut them by little & little, so that sembla- bly (as it were in scrapping soyt) openyng the way, till the cauitie be vncouered, and that you come vnto the middle region (almost) of that Cell, nigh the Membran which there couereth and filleth the little corners of that cauitie, you shall see with small search, the fourme and manner of the thyng before described. And this is sufficient, to certifie you of the small Offices, or little Bones of the Auditorie Organ.

Now we will conuert our talke to the fashion, making, and construction of the upper iawe, called of the Grecians ἡ ἀνω γνάθος or γένυς. Which, as testifieth Galen, consisteth not of one onely bone, but of many, whereby the better it may endure, & not to be altogether afflicted by the annoyance of some one part. Col. therefore sayth, the upper iawe is easie by the poynting of the finger to be demonstrated, but no bone or part more difficult then it to explicate in wordes: in respect of the manner and figure, how many, and with what bones it is made: as also how it is from the other partes of the head distinguished. But first note that the upper iawe, amongst all kynde of creatures, is except from naturall motion, the Crocodile excepted: whose upper iawe is onely mouable, but the neither still at rest: and the Popiniaye, who not onely moueth both at once, but seperately also one after an other: which is notable truly to be obserued, if we searchyngly enquire amongst the deepest secretes of nature: since that one kynde of creature varieth from all others to playnly, and in such a notable poynte. But onely thus, as faith the aforesaid Authour, we must content our selues to see the effect: although we be ignorant of the cause. And very bayne it were to contend vpon the upper iawe of man, for want of motion, or to searche the cause why (like to the Crocodile) it styreth not: since no commoditie (but in ridiculous manner to de- fourme the face of man) might ensue by contraction, and of bgly wrinkles appa- rance, which of necessitie must corrupt the fourme of the countenance, beyng now to the beholders so acceptable, and pleasant. But to our matter.

Realdus Columbus accepteth not sufficient, the reason I bid lately extract fro Galen. Which is, that the upper iawe should not onely be made of one bone, but of many, lest annoyance in one part might beyng disturbance to all the rest. But also (sayth he) to the end that by beyng made of many, the Ligamentes produced from his Sutures, might enter the construction of the Muscles, to make their be- gynnynge more firme and sure: in like sort, as in other places, they also are confir- med by the Ligamentes, from Appendances proceeding. Eustachius writeth thus that it were necessarie the upper iawe should be of many Bones constitute, be- cause it is not euery where of lyke Soliditie & thicknes, but here gristelly, there Solid, and in that place Spongie.

To giue you an apt number, of how many Bones this superior iawe is natu- rally constricted, I am halfe assayed. For neither (as I confesse) could I finde at any tyme to be satisfied my selfe therein, nor amongst authorities, such congruent opiniōs as might incite me to subscribe vnto: onely as it is sayd I will set down,

C. ii.

take

That these three Offices seme to the Organ of hearing.

The Offices of hearing are now Solid, the third excepted. The administration of the Offices of hearing.

The description of the upper iawe promised. Lib. 3. de Oss. Why the upper iawe is not made of one onely bone Col. lib. cap. 8. The explication of the upper iawe is difficult.

The Crocodile moueth his upper iawe.

Columbus setteth the Popiniaye to moue either of the iawes

Why the upper iawe of man was not made to moue.

In the creating of man nature had care of the comly fourme.

A second cause why the upper iawe was not made of one bone onely.

Lib. 1. cap. xij. A third cause why the upper iawe is made of many bones. Of the number of the bones of the upper iawe. This contrariety standeth vpon no deepe poynt.

In introduction  
sue Medico.  
Lib. tr. de Vi. part.  
Lib. de Ois. cap. 1.  
Vesal. Lib. 1. cap. 9.  
Realdus. Col. Lib. 1.  
cap. 8.  
The description of  
of the bones of  
the upper iawe in  
generall.

The peculiar cir-  
cumscriptio of  
the bones of the  
upper iawe.

The first bone of  
the upper iawe.

Vesal. libid.

Col. ibid.  
The description of  
the second bone of  
the upper iawe.

Where the dis-  
ease called Agi-  
loma commeth.  
Lib. 10. Vi. part.  
cap. 11.  
How the excre-  
ments of the  
brainne fall to the  
nostrils.

Vesal. libid.

3.  
The third bone  
of the upper iawe  
Col. ibid.  
Vesal. tr.  
Galen reported in  
his descriptions  
of the bone of the  
cheeke.  
Col. ibid.  
The borders of  
the cheeke bone.

take and leaue at your pleasure. Besides that Galen in diuers places, hath diuer-  
sified his owne opinions, yet at length both he, and *Vesalius* after him haue consen-  
ted, to make the number of these Bones xi. that is to say, on eche side sixe. But  
*Realdus* sayth xiij. as he hath euer obserued: that is v. on either side, and one odd.  
Which is last of all to be declared: but first note how these bones by thre notable  
Seames, are separated from the bones of the head. First by the vj. which down-  
ward from the extremitie of the Coronall Seame, is carued under *Inguale* to the  
extreme teeth, and ended at the Palate. The by the viij. Seame, which, beginning  
at the hollowes of the temples, and creppng vpward, ouerthwartly deuideth the  
face in the toppe of the nose. Last of all with that short & oblique Seame, where-  
with those two Procelles are committed together which constitute the bone placed  
ouer the tempozall Muscle, called *Inguale*. These bones so seperately haue their  
circumscriptions after this sort.

The first, whose fashion is diuers, is committed to the ioynng and metyng of  
four others. For in the hinder part it sendeth forth a Procelle, which fashioneth  
the one portion of the Jugall bone, beyng conioyned by an oblique Suture (as we  
haue sayd before) to the Procelle produced from the tempozall bone. Afterward,  
in the hollowes of the temples, by the benefite of the Cuneiformed or Cuneall  
bone, it is committed to the vj. Suture, thence agayne, downwardes reflected to the  
highest teeth. It completeth also part of the broue, & seat of the eye in the vpper  
part. But in the neither part, with a notable largenes, fastened to a fourth bone  
with a Suture eident in thre places. That is to say, in the hollow of the tem-  
ples vnder the Jugall bone: agayn in the fore region of the iawe, nere the cheeke:  
& in the lower seat of the eye. And thus to say briefly with shorter circumstance.  
This first bone, is first committed to the tempozall Procelle in the Jugall part,  
secondly, to the Cuneiformed bone, thyrly to the bone of the forehead, & fourth-  
ly, to the fourth of the same iawe.

The second bone of the upper iawe is of all the rest smallest, and like a thynne  
scale, in the inner or greater corner of the eye constituting: where lyeth a little peece  
of flesh, which was created for this purpose, that the pituitous excrements expur-  
ged fro the head into the eyes, might thereby be expelled to the nostrils. Where  
groweth those abscesses which the Grecians call *δυσίληπας*, which, beyng neglected  
in Chirurgicall administration, exchaungeth to a lachrymiall Fistule, penetratng  
this bone. Galen sayth the excrementall purgings of the brainne, are receiued  
by this peece of flesh in this angle sited: to the end they might not fall vnto the  
cheekes, but be intruded to the nostrils. This little bone is ended in a vpper part  
at the viij. Suture, which is often sayd to deuide *Os frontis* from the vpper iawe:  
being here committed by the intercession of that Suture, to the bone of the forehead:  
from which Seame, an other likewise after the hinder side of this Officle, disen-  
deth: which creppng by the inferiour partes of the Officle, speedely also ascendeth,  
through the Anterior side therof vpwardes, to the same Suture, that deuideth the  
vpper iawe from the bone of the forehead. To say briefly, therefore, this thyrd  
bone meteth in the vpper part with *Os frontis*, in the hinder part with the thyrd  
bone of the iawe, but in the inferiour, and Anterior part, it is together with the  
fourth bone of the iawe.

The thyrd, which Galen calleth *Os male*, is greater the rest, but of straunge  
fourme, and diuersly Seamed. This containeth and in it holdeth all the teeth on  
the vpper side. Wherein with *Collumbus*, we must needs reprehend Galen, who  
hath exempted from these, the foremost called the Incisorie teeth: as though be-  
twene the Incisorie, and Dogge teeth, were some interceptiue Seame recurrent,  
which, as the same *Collumbus* affirmeth, is in Apes, & Dogges onely to be found.  
But this thyrd bone truly is distinguished from the first bone of the iawe, by the  
common

common Suture, creppng through the middest of the face, vnder the eye liodes,  
into the roundell of the eye: where we say, the first bone recited is committed to  
this thyrd: vpwardly it is seiguated from *Os frontis* by the viij. Suture. In the in-  
ner angle of the eye, it differeth from the second bone by the line, that compasseth  
all that Officle. But in what part it beholdeth the nose, it diffiyneth from the  
bones therof by the Suture from the viij. descendng: and vnder the Palate, front  
that bone which we will call and nuber for the fift, by a great & notable Seame,  
which marcheth ouerthwartly (sayth *Realdus*) through a Palate: where also you  
may finde the line, that through the longitude of the Palate is deduced, rylng vp-  
wardes betwene the incisorie teeth vnto the bottome of the nose, where the in-  
tercessio of the nostrils is made: by the meanes of which assurgent line, this pre-  
sent bone is into a right and a left part deuided. In childzen the trasuerse Suture  
in the Palate, which ouerthwartly on both sides endeth at the Dogge teeth, is in  
elder persons quite abolished, so that the tracke therof may not be found. Lastly  
vpon *Sphenoides* of the Cuneall bone this bozdzeth, where the vj. Suture, after it  
hath deuided the first bone from the tempozalles, departeth into a large cauitie,  
where it is dissipated & wasted, vntill it appzoch nere to the outer teeth. Besides  
all this, and that it is in diuers places Spogious and perforated, this thyrd bone  
of *Os male*, whereof we make this relation, conteyneth in it selfe a very large caui-  
tie, tenderly walled on eche side with thynne scally bones, for no other purpose the  
for lightnes so ordained of nature: so far as hitherto is noted. By these Bones  
hetherto described we may gather: what bones do necessarily come to a constitu-  
tyng of a seat of the eye. For *Os frontis* maketh the vpper part, and the halfe of a  
inner angle: the rest of it is added by a portion of the thyrd bone, which is ioyned  
with the Bones of the nose: the inferiour, and outer corner the first bone wholly  
layeth. In that appertaineth to the interior part of the eye, the second bone, *Lib-  
moides*, and the Cuneall bone do minister their materiall ayde the which seat of  
the eye, because it is excupled round, the Inferiour sort do call a Roundell.

The fourth bone of the upper iawe *Collumbus* calleth that, with *Vesalius* wi-  
teth for the vj. which occuppgng no small scope, admitteth the distinction of that  
Suture, which we haue named to cut the Palate ouerthwartly, endng where the  
nostrils stretch into the iawes. It is deuided furthermore with the Cuneall Pro-  
celles, which we haue compared to the wyngs of Bares: by the benefite of the vj.  
Suture runnyng to the insides of the teeth.

The fift bone constituteth the vpper part of the nose, which is the true bonye  
part, beyng double, but in the lower part is gristely: wherefore neither stroke, nor  
fall, may shew any such rigour thereto (although it be very incident to such casu-  
alties) as if it had bene otherwise made of bonny construction. Wherefore that part  
of the nose that is bonny, is by a middle Seame to a right and left part distingui-  
shed, beyng committed to *Os frontis* betwene the broues by the viij. Seame, oft be-  
fore mentioned: but in departng downward on either part, it is ioyned with the  
thyrd bone by the common Suture of both. Agayne in the inner part, where both  
these bones are vnited with the common line, they cleaue to that diuision, which  
we haue sayd to be part of the bone that assimilath a searse. And thus much as  
touchng ten of the xiij. bones of the vpper iawe, for accordng to the descriptio of  
the v. rehearfed, and appertinet to one side, you haue no lesse to attribute to the o-  
ther side also, by which computation your number shalbe true.

The xi. bone, which it hath liked *Collumbus* to adde, is sited aboue the middest  
and inside of a Palate, within the streites of the nose, and is seuered fro that part  
that toucheth the head, after the whole longitude therof, by a broad cleft, whose  
biforked or clouen foundation, where it is thicker, lyeth to the Cuneall bone, as  
also extended to the constitution of the lower part of the nostrils diuision. Which  
C. iij. note

The transverse  
Suture vnder  
the pointe is  
onely in childzen.

The substance of  
the cheeke bone.

The large cauitie  
of a cheeke bone  
and to what vse.  
Of what bones  
the seat of the  
eye consisteth.

Cap. 8.  
Cap. 1.  
What is the fift  
bone of the upper  
iawe, and the de-  
scription therof.  
The Procelles of  
Ichnoides like the  
wyngs of bares.

The first bone of  
the upper iawe.  
The vtilitie of  
a Cartilaginous  
constructio of the  
nostrils.

The end of the  
first bone.

The description of  
of the xi. bone of  
the upper iawe.



The 1. bone is  
fitted to a plow  
share without a  
handle, and with  
an indented or  
unequal edge.  
The 2. sponge  
bones in the  
nose are easily  
eaten away with  
the Spanisch  
disease. The  
3. bones alway  
found in the  
upper iawe

The neither iawe  
is made of one  
bone and not two  
as Galen would.

Exception that in  
children it is two

Lib. 1. cap. 9.  
To what end the  
neither iawe is  
two in children.  
The figure of the  
neither iawe.  
Why many face  
is round.  
Why the neither  
iawe of beastes is  
so long.

Why the neither  
iawe consist of  
an hard bone.

Wherefore sense  
the cautie of the  
neither iawe.  
The 1. 2. 3. 4. 5. 6.  
of the neither iawe.  
The use of the  
sharp 1. 2. 3. 4. 5.  
The description of  
the second 1. 2. 3.  
of the.

The use of the  
Cartilages serving  
to the 1. 2. 3. 4. 5.  
of the, and his  
cautie.

Why the neither  
iawe is rough in  
the fore part.  
The outline of  
his holes.

notwithstanding (he sayth) is easie to be deuised. The fourme therof imitateth the fashion of a plough share.

To these may be added a ry. and riy. beyng two spongy fashioned bones collated on the inside of the nose, where the filth is retained: and these sometyme through erosion (as diuers Practitioners can auouch), their patientes labouring with the Spanisch disease fall downe, and are ruined.

I haue (right williung Reader) in the delineation of these bones, imitated somewhat narrowly the iudgement of *Columbus*, because, in the inuention of the upper iawe bones, he triumpheth ouer all before his time. Neuerthelesse, if any man of graue iudgement, shall deeme it needles to contend vpon such scrupulous, and sharpe pointyd diuision, as this is in the lyke respect, I will not resist: onely this I say, the truth is to be embraced, and the true inuitor accordingly reuerenced. Thus, the upper iawe decayed, you note how of many bones it is construed, and so, as the right perfect Anatomist findeth sufficient frauile to distinguish them aptly.

The neither iawe it is nothyng so: for although *Galen Lib. iij. de Anatomis administrationibus*, would haue it consist of two bones, as in Dogges, and other Beastes, yet it is certaine that of one bone is made the neither iawe, without distinction, or dissolution: except in Children onely, who by hauing in the utmost part of the chinne a lineall ascense, perhappes incited the other opinion, of the lyke beyng also in all sortes. But to be in Children *Columbus* auoucheth it expedient, onely for the excrete of Ligametes, needfull to the Muscles in those parts adiacent. The fashion of the neither iawe is Orbicular like a halfe long Circle, the utmost endes wherof are ascendently reflected. Neither hath nature, as in other creatures, so long created it, since handes hath man to reach at neede, but beastes, by the length of their iawes, metely apprehend euery thyng with their mouth. Correspondent to the comley figure of the face (also), is the roundnes thereof, whereas the heades of other beastes are more deppressed, and flatted, decent for the long shape of their iawes. Hard also it behoued this neither iawe of man to be, for the strong vse and actions that it hath: yet, together with the hardnes, it retaineth not such Soliditie, as might be an impediment to the light and ready motio therof, but hath on eche side propper cauities with mareyn infarced, though (in man) not so much backwardes sited, as in fourefooted creatures. And except those concaued places, the other partes are Solid, and very durable: yeldyng before in the thynne, called *yveop*, hollowes, propper to the contaynyng of Muscles. At either end of this inferior iawe are two Processes, as it were y. hornes, wherof the first is slender, and pointyd, receiuyng the tendon of the tempoall Muscle: But the other rising with a necke, and headed, transuersly is inserted to the angle correspondant to his proportion: beyng so Articulated with the bones of the temples, betwixt the rote of *Iugalis*, and the Auditoric hole. The head of this Process, and the cautie it entreteth, is covered with a crusty Cartilage: & betwixt the hollow, and the same Process, intercedeth a certaine soft and mouable Gristle, which serueth not onely after the maner of a Ligament, to containe and hold the same in his propper Cell, but also maketh the motion of this manner knittynge more easie, and swift, without metyng and frettyng of the Bones. The fore part of this iawe is not onely rough, whereby the Muscles there might more cleynly grow, but also hath his propper holes for the entraunces of veynes, arteries, and Nerues.

Howeouer as the upper iawe, so hath this (beside those holes) very many Celles and cauities, which, how propper they are to the holdyng of the teeth (so necessary instrumentes for the susteynyng of nature) who knoweth not. These Celles (*Columbus* sayth) in aged persons after the fall of teeth, are done away, and shut

bp

up so, that once among many other tymes, he reporteth he found not the places of two or thre: so were they, and with such Soliditie shut up.

As touchyng the teeth, it is certaine, that the number of them in all persons is not agreeable. For some men haue xxxij. teeth, some 28. others 26. and diuers diuersly: the last recited Author writteth, that most commonly they are numbered 32. that is, xvi. in the upper iawe, and no lesse in the neither. Which we will speake of. These xvi. on a side (therfore) are wont to be deuised into three partes: that is to say, *Molares*, or *Maxillares*, *Canini*, and *Incisori*. Which more playnly to decaye, note that the foremost foure are named *Incisori*, as touchyng their offices, so ordained to cut, and make the first bite in takyng of meate, being broad, flat, and sharpe, like the fashion of a Chisell, broader beneath then aboue. Next on eche side of these groweth *Canini dentes*, beyng in either of the iawes two, called so, for that they are roūd, and pointyd as the Dogges: these beake the bite first, receiued in by the incisore teeth.

How of the Grinders, called *Maxillares*, or *Molares*, are fine on eche side, both aboue and beneath. Which, accordyng to their names, are also made to grynd, and treat a sunder finely the meate receiued into the mouth, no otherwise then as the mill stones that grynde the grayne, so finally these mince it in makyng y cheloyng, beyng for the purpose broad, hard, great, and rough: why they are rougher who hath not the reasō, since the waight and hardnes of Millstones sufficeth not, without pecking and making rough, as oft as they become smooth. So these teeth (besides) are large and great the longer to endure, and the easier (by their bredth) to contayne the meate in breakyng.

Hardnes to the teeth is a most conuenient propertie (which they haue not scantily, but playne thereby to be distinguished for all other bones in the body) not onely requirynge such excedyng Soliditie for the swift diminishyng of the meate, but principally, that to the bodies vse they might detract a longer tyme. Which neither would haue bene sufficiēt, had not nature prouidently, & right prudently foreseen the same, by enlargyng their growyng almost perpetually: that as they dayly weare, so they might dayly renew, and be encreased in their places. Betwene euery tooth are euident distinctions, or hedges, ordained in the substance of the bone. Wherfore (as we haue sayd before) the manner of their situation in the iawes is named *Gomphosis*.

It is furthermore to be considered, that the implantation of the teeth is not in one, as an other sheweth. For the Incisore, & Dog teeth are simply rooted, but y Grinders not so: for they of the neither iawe haue two, but the upper (commonly) with iy. rootes are endewed: sometime also (though seldome) the upper hand foure, and the neither iy. Those next vnto the Dog teeth (I meane of the Grinders) aboue, may be said with two holes infixed, then, there answerable mates below haue but one, and those shorter then the other: so that the superior, surmount the inferior in the length, and number of rootes: because those are dependant, these euer sitting in their Celles: neither maruella though y hindmost Grinders haue shorter holdes then haue the rest; consideryng that their vse and labour is lesse, in Leuigatyng the meate, or whatsoeuer is els receiued into the mouth.

But now to speake somewhat generally of all the teeth, we say, by the probable assertions of the best forewriters, that from all other Bones (to the partes of mans body appertinent) the teeth do playnly differ in manner of wayes.

First in their hardnes, which we haue somewhat touched before, necessary to the Communion of meate, to be more expeditely done.

For the second difference I infer their sensibilitie, wherein they excede them most notably: the whiche propertie (as we haue hereafter in our History of Nerues described) they obtaine, by the access of certaine Surcles from the thyrd coniugation

where the Celles  
of the teeth do  
growe up.

The number of the  
teeth are diuers,  
some 28. some 26.  
some 32. that is,  
xvi. in the upper  
iawe, and no lesse  
in the neither.  
The Incisore  
teeth are made  
ones & why they  
are made.

The dogge teeth  
their bre and  
mologie.

The teeth called  
Grinders.

Why they are  
rough.

A reason of their  
bredth.

Why the teeth  
are so hard.

That hardnes  
was not sufficiēt  
to immptate the  
said that they  
growe till the last  
age.

Gal. lib. 5. de com-  
medicandi Loc.  
The teeth are in  
the iawes Attenu-  
lated by Gompho-  
sis.

Of the rootes of  
the teeth.  
The Incisore &  
Dogge teeth are  
simply rooted.  
The upper Grin-  
ders haue alway  
two rootes then  
the neither, and  
the reason why.  
Why the hindmost  
grinders haue  
shorter holdes.  
What difference  
are betwene the  
teeth and y other  
bones.

How the teeth  
are made sensibile.

Why other bones haue no sense.  
The nerves that runne through the bones of Skull and Vertebres giue them no sensibility.  
How much of the tooth hath sense.  
Why part with in the Sinues teeth.

That it behoued not the bones to feele.

That the teeth haue sense neede fairly.

How the teeth are decayed.

If Nerves be inserted to the rootes of the teeth, they must needes haue sense.

Quid, Lib. 1.

Lib. 5. de comp. secundum Loc.  
The teeth haue payne and pulsation.  
The cause of pulsation and payne how they feele & are nourished.  
The differēce between the teeth and other bones.

How longe the teeth doe grow.

How the rootes of the teeth are perforated, and to what ende.

contugatio of the Sinewes of the brayne, disseminated. Which, crapping in at the rootes of the teeth, giue vnto their substance the woorthy facultie of feeling: whereas other Bones admitte no portion of Nerves into them, although diuers passe through them as some do through the Skull and Vertebres, for the transfusion of sense into other partes. Their sensibility (notwithstanding) is not to be attributed to their vniuersall partes, as those also that are already in sight, and prominent forth of the Gummies: for such places of the teeth *Columbus* proueth (by the testimony of his familiar *Iho. Baptista Mazzolarius*) to be void of sense, and so much as is infused within the Gummies to be perfect sensible, by vertue of the Nerve extended to that region. Wherefore their Assertions are odious, and most lothsome to aunswere, who fantastically sayne, that all Bones are sensible, or els the teeth also destitute of any feeling: as though it were as much requisite for the Solid partes of the body, and such as, no otherwise then the frame worke of a house, do suppozte, the other members should retainē as delicate sense as other partes & Organs of the body, whose functions without the same, were frustrate, for who knoweth not (as I haue also other where said) how incommodious a thing it were, if the sense of feeling should be imparted to the bones: whilst so no man might endure halfe the bigour of his bodys motion, without intollerable payne in all partes. Contrariwise, who dotheth so much as that he will not know, the transfusion of sense into the teeth to be necessarily taken: that thereby they might reueale vnto the common wittes eche outward, or inward annoyauce, which might corrupt or destroye their proper substance, either by eruption, erosion, heat, or cold, considering how needfull they are to susteine nature, and how necessary to the comly fourme of the countenance. And we see it hapneth (many tymes) that they are ruined, by such crucible tormentes of Rheumaticke incur-sions, or other like affectes, that no Medicin may preuaile to procure the patiēts ease, till the same dolorous tooth be extirped & plucked by by the rootes: at which seperation, and departing from the sensible Surcles or twiggies of the Sinewe as foreshayd, how paynfull it is, I referre it to the sentence of them that haue tasted the bitterness therof. And if any man will wilfully runne in such absurditie, as that he will deny the insertio of Nerves within the rootes of the teeth, to be of nature ordained for any purpose, let him still lye drownd in dreaming doubtles, till his senses be sopt in solitarie sobbes, to pine in pining, as the Poete feyneth the transfiguration of *Cygnus* into the shape of a Swanne: for none are so obstinate as the ignorant: the wise are alwayes consentyng vnto truth. Wherefore this to them. *Galen* (who feeling the smart sometyne him selfe) alloweth in the teeth not onely dolor, but also pulsation. Whereto *Realdus* readely agreyng, professeth by publike dissection to haue rightly inuented the cause: since to euery tooth not onely a Nerve, but a Veyne also, and an Arterie, are preferred: so that by vertue of the sinewes the teeth feele, by the commyng to of the Arterie they haue pulsation, and by the felowshipp of the veyne are nourished: whereby they continually encrease: which maketh the last of the three differences, whereby I distinguished the nature of the teeth from other bones. What is to say, that:

They are not onely nourished, but also perpetually grow: whereas the bones euer cease to enlarge after the consistence of yeares. Wherof euery man is expert. And accordyng to the sentence of *Galen*, they augment, and are nourished the space of forty and five yeares. But in *Lib. 5. de comp. Med. secundum loca*, he sayth, they encrease almost the whole terme of mans lyfe. And thus much of the triple fourmed difference. Now I will returne agayne to the peculiar properties of the teeth.

Among which, it is woorthy to be noted, that all the rootes of the teeth are perforated, and perced through into the Celles or Cavities within the sayd rootes: which

which are very litle, but most notable, to comprehend more aptly the partes, whereby they are nourished, for at these holes the teeth receive, both the Veyne, Arterie, and Sinew lately spoken of. Which three vessels, penetrate and pearse into the litle cavities and foundations of the teeth, where they are complicate, & among them selues beget a certaine litle Membran, whiche sometyne receiveth of the Rheumaticke matter that from the brayne distilleth: which to oft initieth the ingent dolor, and tormentes of the teeth, which seldome cease to perseuer with them, as long as that Humor in the sayd Membran is deteyned: or untill of the Fluxion by purging the brayne, the cause be aptly consumed.

Moreover, for so much as appertaineth to the generation of teeth, it is woorthy to be approued, that not at that very instant when they issue forth of the Gummies, they are engendred: but rather the rote of their generation is in the infant, whilst it is swathed in the mothers Matrice, first begon, if experience may be a testimony sufficient to satisfie vs, or the authoritie of *Columbus* credible: the which rootes, or begynnynge, preordained of nature for the after growyng of teeth, he proueth to haue inuented many tymes, and so oft as he had occasion to search in children, that neuer were extract, or brought to light, as also in Abortes, bearing short the tyme of 14, or 15, monethes.

Furthermore, the first Dentition of children bringeth forth Appendances, which in Procelle of tyme (for the most part) fall away, and others with more sollicitie are produced in their places, which seldom so easely fall agayn. Wherfore in persons of riper yeares I reckon no Appendances: notwithstanding that in some, the fall of teeth are renewed at many yeares.

It needeth not to be inferred, since therein experience instructeth eche man sufficiently, how greatly they auayle to the modulation of speach. And that principally, the Incisorie teeth: which besides the aboue rehearsed, haue this propertie: as in persons full of dayes the like example is explained, in whom, the losse of one or 2, Incisorie teeth, yeldest a perpetuall maine to their accustomed utteraunce. And this of teeth sufficeth.

But since in a later Writer is expected a newer stile, and that I not onely profess more appertinent polittie then the rest of our Nation, that befoze haue traualled herein, but also to haue for my guides the most princely Anathomistes of latter yeares: If I thus forsooke, or breake of my descriptio of the head, in professyng to open I should but shut, and in meanyng to discover I should but hyde the light. For, as touchyng the Holes of the head, and such perforated places as yeld no lesse pleasure to the passage of Veynes, Nerves, and Arteries, then they inferre delite by induryng to those partes sense, nourishment, although the ancient sect of Anathomistes, and *Galen* himselfe haue pretermitted occasion to enterlace among their other discourses the description, and offices of these holes in the head: yet *Fesalius* giueth the onset in this enterpryse: who *Columbus* hath followed: no lesse laudably the dexterity of his witte, and singular intention. I therfore (sindyng in them both so much matter for the purpose as I could wishe, and the tenor of their treatise to present such a summe of excellencie, as that the ignorance of this case, bringeth forth no small obscuritie to the vnderstandyng of the Historie of Veynes, Arteries, and Nerves:) concluded with my selfe, to imitate the type of their Assertions, as also (in other cases) I haue writt with their consentes, as it seemeth woorthy. Wherfore, considering that nature created the bones for the cause of the other partes of the body, as we haue sayd, it was also requisite, that so they might be fourmed, as not onely the other partes might aptly be fastened vnto them, but somewhere also to penetrate their substance, for their safer defence. Which nature wisely wayeng, no other wise, then as her accustomed prouidence is apparant in all thynges, hath in the Bones diuersly, here,

Of the Membran in the rootes of the teeth.

How becomēt paynes do happen in the teeth.

That the teeth are engendred in the mothers wombe although they appeare not.

Lib. 1. cap. 3.  
*Columbus* tried it in newe borne and in such Abortes as came by of 15. monethes ere due tyme. The teeth haue Appendances which, fall away.

The last brittle of the teeth.

How we possesse this last brittle.

It will be expected that I omitte nothing, since I haue promised to whole History of man.  
How necessary is the knowledge of the perforations of the Skull.

*Galen* wrotte not of the holes in the Skull, that is evident.

How incommensurable is the ignorance of these perforations.

That bones were made for the cause of other partes.

Why the bones  
are perforated.  
Of the holes fer-  
ring to the big  
conjugation of  
Sinewes.

Col. Lib. cap. 11.

The holes fer-  
ring to the first  
conjugation of  
Sinewes.

Sphenoides like a  
cell of seat gra-  
ued in the foun-  
dation of the  
brainne. The hole of  
the opticke Sinewes.  
Why it is called  
the opticke Sinewes.

The holes fer-  
ring to the second  
conjugation of  
Sinewes.

That the second  
conjugation of  
Sinewes mo-  
ueth by the  
muscles of the  
eyes.

The description of  
the great rift in  
the lower corner  
of the roundell of  
the eye, & the  
way of the  
conjugation.

The way of the  
conjugation from  
the eye to the  
brainne.

The hole of the  
eye in the  
brainne.

How teares are  
engendred.

The hole in Sphenoides.

The originall of  
the muscle called  
the Masseterall.

A branch from  
the big conjugation  
to the Masseterall  
muscle. A branch of  
the big conjugation  
to the eye to the  
face.

An other hole in  
the Cuneall bone.  
A branch of the  
third conjugation  
to the teeth and  
temporall muscles.

The big conjugation  
of Sinewes  
downe to the  
teeth & the  
temporall part  
of the tongue.

here, and there scattred Holes, for the seruicable entrance of the aforesayd Vessels: as in the bones of the head are to be described manifestly. Amongest which briefly to enter, it behoueth first to begyn at those, which serue to the seuen payze of Sinewes proceeding from the brainne: forasmuch as, of all other Sinewes in the body, or produced from any part els, they are most noble.

In the inner feate therfore of the skull, where *Os Cuneall* is insculped like the manner of a seat, or stole, which is the foundation of the trayne: and nere vnto the Processe super eminent of the same feate, are two Holes forced through the same Cuneall bone, that is, a left and a right, stretching into the seates of the eyes, and into their rootes penetratynge, nere to the sides of the inner angles. Through this hole on eche side, issueth forth a notable great Nerue, called the Opticke Sinew: wherof we haue made mention in the Historie of the Eyes: which like vnto a rote, is implanted into the middle of the eye, for the transportynge of the visibill vertue thereunto.

Nere to the borders of these, is a Semicircular hole, or sometyne like a perfect round compasse, through which is caried the second conjugation of Nerves: these deduced through the great rift, into the eyes: inspyring the meanes of motion to their Muscles. This great rift is that which in the lower part of the roundell of the eye, and towards the region of the outer corner, beneath imitateth the fourme of a round hole, but beyng in the upper part broken, is extended into a long and ample cauitie, which not onely yeideth passage to the second conjugation of sinewes, which are disparcelled for motion sake among the Muscles of the eyes, but also to other branches deriued from the thyrde payze, hence disseminated among the partes of the face: going forth by the holes insculped in the bones, about the inner angles. Furthermore this cleft is the seate, proper to the Muscles of the eye, which thence fetch their begynnyng, admytting Veynes, and Arteries, transmitted to the eyes: and to the nourishment of the Muscles of the eyes.

In the inferiour part also of this large cleft, where it is round, and towards the inner angle lurketh a hole, which creepeth as with a bynd way downe to the Palate, and nofstrils: through which the subtil moisture of the brainne, first receiued by the Glandulous substance sited within the roundell of the eye, syddeth downe naturally to the sayd nofstrils, and Palate: the which liquid matter because it falleth: first into the rift pertainyng to the eyes, it may be coniectured the meane whereby teares are engendred.

Under the same rift, in a more crooked region of *Sphenoides*, a little space betwene, is discerned a hole on either side, making a crooked recoile from the seate of the same bone, which beyng after a certayne maner rosio, is also long, scampyng directly to stretch straight into the seat of the eye: reflecting neuertheles towards the sides where the temporall Muscles is, as also the originall of the Masseterall: through which hole, a branch of the big conjugation taketh direct incurse into these Muscles, associated in like manner which part of the thyrde conjugation, transfused through the lower part of the eyes to the face, no lesse mingled with the Masseterall, and Muscles of the temples.

Beyond all this, in the same Cuneall bone is an other hole decreed, beyng appertinent to the aforesayd partes representing the winges of *Battes*: through which a portion of the thyrde payze of Nerves is transmitted to the teeth, and temporall Muscles: but not alone, nor without the company of the fourth conjugation, entryng the same hole downe to the tunicle of the Palate, and superiour part of the tongue, for the cause of tastynge.

Nere to this perforation or described hole, at the rote of the temporall Bone (which is eminent inwardly like a beame or poste, the better to contayne within it the noble laborinthe of hearynge, as before now we haue largely touched) an other

ther greater hole appeareth, as it were broken, rough, & vnequal, tending downe wardes, giuing issue sufficient, for the Exiture of the thyrde coniugations portio: wherby also no more stoppage is offered, to a branch of *Vena singularis* that nourisheth the Anterior partes.

But departing a little aside, somewhat more towards the temporall bone, a very small Hole approacheth to the sight, which for the littleness therof, is many tymes (I meane in some Scalpes) not found. Wherfore to speake therof, in such as you shall happen to finde it, note, that nature committeth thereto the safe conduct of slender twigges of Veynes, & Arteries, to be distributed among the partes of the thicke Membran of the brainne. But beyng denyde of this passage in some, with no lesse labour they take their way, through the large and vnequal hole before described.

From which large hole, not farre, an other hole, not very conspicuous in the inner part of the skull, appeareth, and is noted by a round cauitie, and long entryng at the aboue named hole, plainly appearyng vnder the Interior rote of the stillfourmed Processe, and obliquely euident or shewyng his way towards the Anterior partes: which ought to be the progresse of the *Stepy Arterie*, whereto nature made and prepared such passage.

In the same temporall bone a place is perforated, scampyng long in the toppe or outer part, penetratynge the laborinthe with a bynd and difficult conduit, finished at length in the extreme region of the eare: beyng called the bynd hole, in consideration of the obscure passage: herein maketh entrance the first payze of Sinewes of the brainne, as the immediate Organ to induce the faculty of hearing.

Under which hole, betwene the temporall bone, & the hinder part of the head, is a large and vnequal hole, through which is deduced the by. payze of Sinewes: which stretchyng downe to the bowels, make in the meane space the recurrent Nerves, not meanelly profitable to the fourmyng of speech, as we haue not forgotten in our Historie of Nerves. No lesse seruiceable seemeth this hole to the *Inguar Veine*, suffryng the ascense therof for the nourishment of the brainne: the which Veine also fasteneth to *Dura mater* beyng carped forth with a double windyng, and finally falleth into the Posterior part, the bone manifestly giuing place to it: that is to say, contelyng a profound cauitie towards the Labdall Suture, crooked after this manner.

In the bone of the hinder part of the head, nere to the hole of all other, within the skull the greatest, we finde one not very large, where through the by. conjugation seeketh way: chalenged partly of the tongue, partly of *Larynx*, and partly of the temporall Muscles.

Now we come to the greatest hole in all the head, which beyng in the same bone as is the last recited (atleastwise among the holes of the inside of the head it appeareth as is sayd, but to compare it to them on the outer side of the skull, is to be esteemed scantly so ample and large as the roundell of the eye) is sited in the middlest, because it hath no mate. And it is ordained of nature, for the descension of the spinall marie from the brainne.

Betwene *Os frontis*, and the middlest of the big bone of the head named *Ithmoids*, is a cauitie rather than a hole, where the thyrde Cell or Vetricle of the hard Membran of the brainne, is firmly settled.

Neuertheles besides this, in the same *Ithmoids*, nere *Os frontis*, are two little long holes or riftes, rather finishyng, and fullillyng the endes of the Organs of smellyng. But these not all: for in *Ithmoids* are yet many other little perforated places & chinkes, as it were the small sittyng holes of a searse, ordained aptly of nature for the purposes, which we haue not in their proper places pretermitted.

To speake of *Os frontis*, in the region of the bones we finde two holes, on eche side,

The hole fer-  
ring to a portio: the  
big conjugation  
of Sinewes.

7.

A little hole which  
is sometime abrid.  
See the intell  
of nature where  
this little hole is  
wanting.

8.

The hole of the  
Stepy Arterie.

9.

The blind hole.  
The first payze of  
Sinewes ferueth  
sense to the Organ  
of hearing.

10.

The by. conjugation  
of Sinewes  
to the bowels.  
The first con-  
jugation maketh the  
recurrent sinewes,  
which toyne the  
bowels.

11.

The inner Inguar  
Veine nourisheth the  
whole brainne.

12.

The hole to the  
by. conjugation  
of the brainne.

13.

The greatest hole  
in the Occiput and  
the big thereof.

14.

The big of the hole  
betwene *Os frontis*  
and *Ithmoids*.

15.

The holes of the  
*Ithmoids*.

16. 17.



The holes for a portion of the in-  
comigatio, to the  
artifices of the  
foresaid and eye-  
lides.

18. 19.

The cauitie in  
the front.

In the cauitie  
of the forehead  
much ayre, some-  
tyme, the ayre is  
founde.

The holes of the  
cheeke bone  
A portion of the  
incomigatio of  
arteries to the  
artifices of the  
nose and lippe.

Whence it humi-  
dific descendeth  
to the nostrils  
and eyes.

The place where  
Aequi called  
lachrymal fistule  
happeth.

Why the eye pay-  
ned, the temporall  
arterie may be  
affected.

The holes in the  
face.

The roundels of  
the eyes.

The holes of the  
nose.

The Jugall bone  
like a bridge.

The seat of the  
temporall muscle.

By what parte  
legue descendeth  
to the moystning  
of the palate.

A portion of the  
incomigatio  
endowing the  
of the palate with  
the sense of tastng.

Of the holes of  
the nether iawe.

side one, through the which a portion of the thyrd coniugation of Nerves, is sent unto the Muscles of the forehead, and eye lides.

In the forehead moreover, above the toppe of the nose, (where the skull disposeth in such sort, as it seemeth to be efformed of two scales, outwardly, and inwardly) are contained two notable cauities, mentioned somewhat before in the circumscriptions of the bones of the head: which Celles, I haue there noted to represent this proportion. They haue entrance into the nostrils, and containe nothing but a Membran: except it be sometime superfluous filthe, and ayre sometimes, as it is supposed. But surely they seeme altogether unknowne of the ancient Anatomistes, in so farre as in all my tyme I haue read: the vse of them, in retaining ayre, is other where to be declared.

The bone of the cheeke vnder the region of the neither eye lides, hath a round hole, which beginning at the inner and inferiour part of the roundell of the eye with a long and deepe chinke, endeth towards the region of the first tooth of the grinders: through which is transmitted a portion of the thyrd coniugation of Sinewes, delated to the Muscles of the nose, and those that constitute the lippe.

There is a large issue in the lower part of the greater angle of the eye, forged betwene the second and thyrd bone of the upper iawe: and here happeneth the descense of moyste matter unto the nostrils, before lodged in the inner angle of the eye, where a certaine Glandule (for the purpose) is prest to receive the same. In this place is engendred the lachrymal fistule, called also *Aquilop*.

But contrariwise in the exterior and lesser angle of the eye is a large rift, and long, partly perforating the bone of the temples, and partly of the upper iawe. Hereunto is fixed the temporall Muscle: which therefore to the eye hath no small assistance. No marvaile therefore if the eye in dolour labouring, this Muscle sometimes be affected also.

In the face first we note the two holes, or roundels of eyes: which for asmuch as they are sufficiently knowne of all men, to be unto the eyes most proper habitacles, I haue not long detraed the tyme.

But somewhat lower, and betwene them both, are the two holes sited of the nose, which haue recourse unto the iawes, and to the endes of the Palate.

It is knowne, and easely conceiued, by inuention made therof before, among the bones of the head, that the Jugall bone, made by the reaching, one and meeting of two Processes, like the arche of a bridge, (as I haue also compared it) maketh vnderneath it a hole, mete for the secure situation of the temporall Muscle.

There is in lyke sort one hole in the middle of the Anterior part of the Palate, mete in y line nere to the Incisorie teeth: where through not onely a Veyne, but also an Arterie pearseth. So also yeldeth way to the letting in of liquid humors, fitte to humect, and make moyste the Membran of the Palate, which to that hole is bound, after the fashion as *Dura membrana* is knit to a little hole somewhat above the distance of *Isthmoides*.

In the extreme end of the Palate, not farre from the hindmost teeth, is found on each side a hole in the fifth bone, which we call the fourth of the superiour iawe: the which hole is produced into two sharpe corners, admytting together with a Veyne, and Arterie, a portion of the fourth coniugation of Nerves: making the tunicle of the Palate to participate with the sense of tastng.

Yet further, the nether iawe (which although it seemeth needlesse to describe the maner of holes therein situate, for asmuch as so particularly I haue touched them before in speaking of the neither iawe: I will neuertheless thinke tyme euill spent to rehearse them agayne amongst the holes of the head, because part in present occasion to be reuealed, and part hidde; should not soone aptly to a perfect description): hath two holes on eche side, those of the inner side beyng larger then

the of the outer. By which, both Veynes, Arteries, and Nerves are sent to the singular rootes of the teeth, with lyfe, nourishment, and sense: a portion of the which Nerue goeth out unto the chinne, and Muscles of the nether lippe, by these two holes that be on the outer side mentioned: to finde out the way of the which coniugation and portion, transmitted to the temporall Muscle, it behooueth to finde out the double hole in the foundation of the head in that part (I meane) of the temporall bone, which is next vnto the Cuneall bone.

And in the hinder roote of the Proesse *Styloides*, is easily discerned a hole, by which a Veyne and Arterie maketh entrance to nourish the Organ of hearyng. Nighe to the Mammillar Proesse, in the hinder part, is a way for the coniuging in of Veynes, and Arteries: which to nourish the Bones, we account it no bayne seruice.

Bestibes all these notable holes, and euident to be described for the most part, let it not seeme tedious vnto you, to consider, that in the head and scope of the skull are yet diuerse and sundry little Perforations here and there disparcelled, which for there unlike beyng, and variable order, it seemeth a thyng vnpossible to make of them direct description: although it can not be denyde, but their vses are equisite: for as touching the conuent of Veynes and Arteries, within the inner scope and capacite of the head, and such as passe to the thicke Membran: the lettngs in, and entrance by the sayd holes, as they are necessary, so vniuersally almost in euery one. It auayleth not much to remember vnto you the seates, or Celles of the teeth, sufficiently discoursed before. For not, for the number of holes are made the lyke number of rootes, in teeth, but rather that nature, for the nuber of the teeth, created the number of places agreeable.

It needeth not to be doubted since the thyng is most certaine, that as the frame of bones in man are exceeding requisite to the supporting of the members, so are they no lesse acceptable to the insertion of Muscles. Wherefore in the toung (which nature created for so many good considerations, beyng made of such soft & fleshy substance) it were expedient to haue efformed some bone, whereto most aptly the Muscles therof might be affixed, and tyed: as a ground worke, or stabilitment to sustent the whole worke. Which, prouident nature (whose foresight in all thynges is vnspokeable) perpendng, and willing to make a member so seruiceable, indigent, or needfull of nothyng to maintaine the perpetuities of his action, insired in the roote therof a bone, not fashioned after any common proportion, but so rare, as that place required most notably.

Wherefore according to the proportion therof, so the Grecians haue named it, that is to say, for asmuch as not a little it resemblith the figure of the Greek letter *lambda*, it is called *λινθοειδης*, but with more contractio of speech *Hyoides*. It is not wanting (as *Theophilus* testifieth) that some haue given it to name *λινθοειδης*, though the more inuiously: for truly it hath no such streitenes in any bought therof, as appereth in the fashion of the Greek letter *lambda*, but rather (as *Realdus Columbus* writeth thereof) it may be compared to the nether iawe. I will omit to speak of the diuers names, which diuers Authoys diuersly haue therof imagined, and inuented: and so, as it may not vniuersally be furnished, the most of them neuer diffected the body of man but of beastes. But to our purpose.

Nature (as I haue sayd) efformed in such sorte this bone *Hyoides*, that although it be situated to the iawes, and Organ of voyce, yet so that it giueth also free scope vnto inspiration, and to passage of substance, both meate, and drinke: the middle Officle therof is connected and knit to an other greater Officle in the Anterior part towards the mouth, where it ioyneeth with a very Obuse or blunt corner: but the hinder part therof, which is more inward, and towards the iawes, is hollow in reflected or bowed manner. So above Gibbons, but in the in-

To the rootes of  
all the teeth is  
caried a Veyne,  
Arterie, & Nerve.

A portion of the  
incomigatio to  
the temporall  
muscle.

The hole to the  
Veyne and Ar-  
terie for the Organ  
of hearyng.

The small Per-  
forations in the  
Skull are vnice-  
taine as touching  
their places.

The number of  
teeth ordereth the  
nuber of Cellow.

The ble of  
bones.

Why to the toung  
a bone was nec-  
essary.

Hyoides is a bone  
peculiar to the  
tongue.  
Lib. 3. cap. ult.  
It is more sight-  
ly called *λινθοει-  
des* than *λινθοει-  
des*.  
Lib. 1. cap. 22.

The forme of  
Hyoides.

The description of  
Hyoides.

The insertion of  
the toung to Hy-  
oides.

erious part hollow. And thus are the partes thereto fixed : as the Anterior, and Superior part admitteth the insertion of the tounge, construct & made of y. Muscles, whose small difference, is ended at a certaine Procelle eminent in the upper part of this bone, about the middelt of y. bought therof: but y. hinder & lower part of this bone, being hollow and round bowled, was for the purpose fitly forged, to giue place to the opening & lifting vp of the litle tounge : which as a doore or gate is seruiceable to *Larinx*: & for that cause, called of the Greekes *Epiglotte*. To the borders of the sides of the middle of this bone : are annexed two other with two litle long Procelles, hauing also extreme Appendances: which, with Ligaments are fast knit vnto the Superior sides of *Larinx*: fro which Procelles (no doubt) spring Muscles also, seruyng to the motions of the tounge. Moreover, because the strength of this bone had not bene sufficient, hauing but this one single insertion to *Larinx*: nature added two other Procelles, though not so large as those before described: neare to which, these together arise: but in the upper part, where is the greater Officle sited in the middelt, there it is ended. For by these Procelles, is *O. Hyoides* fast knit vnto the Stillfoumed Procelles, proceeding from the Temporal bone on each syde, with a notable strong Ligament: whereby it is so firmified in the middelt, as to neither part it easely slippeth.

And thus of fine bones *Hyoides* consisteth: the shape, situation, and construction wherof (as it seemeth to euery man) was so well pprovided for, that as it is fastned to the iawes & to *Larinx*, so yet it yeldeth ample scope, not onely to breathe, and inspiration, but likewise to the transfigure of meate and drinke, as is sayd before. *Columbus* writeth that sometyme the Procelles are found wantyng: as for example on one syde onely: whose places then nature supplieth with Ligamentes, longer extēded, and stretcht, from the endes of the middle Officle, vnto the Stillfoumed Procelles: so as euerymore her worke is exactly finished.

**L**arinx (I know not properly what English terme to giue it) is the toppe of *Alpera Arteria*, or the heape therof, whiche reacheth vp vnto the mouth and iawes : to the hinder part, and toppa wherof, we haue before affirmed the bone *Hyoides* to be implated, and committed. This *Larinx* is the Organ, by which we receiue and put forth the breath, as also of making and founnyng voyce : as the description therof shall make it manifest vnto you. For to the founnyng therof cometh not onely bones (perhaps Reader thou wilt maruaile that I say bones, but read to the end) but also, Cartilages, Ligamentes, Muscles, and Membrans : besides that I omit both Veynes, Arteries, and Nerves.

The bones that come vnto the construction therof are in number v. of which there are two the largest, that do constitute almost the whole body of it. In the hinder part they are largely disynned, but in y. fore part united by a sharpe crest, or corner: as we may make comparisson, like the setting together of the ribbes of a Rute: the Image of it assimulateth a Shield, such as in tymes past, were perhaps vfed in the warres: and are vfed as yet of the Turkes, as *Vesalius* writeth: which caused the Anathomistes to call it, for the likenes of the thyng, *Scutaleum*, or *Scutiformem Cartilaginem*, or *Peltalem*, the Gretians bopeoedē.

The posterior part therof both aboue, & beneath, putteth out from his sides two Procelles, that is to say, aboue on each syde one, and beneath on each syde one : of which, the two uppermost are wont to be longer then the nesthermost, and with Membraneous bandes, are tyed to the lower sides of the Bones representyng the shape of *O. Hyoides*: but the inferior Procelles of this same shield, are towards the posterior sides of that part, whiche other Anathomistes do call the second vnnamed Cartilage, but *Columbus* maketh it the thyrd vnnamed bone: the founne wherof, is like the rynges, which y. Parthians vse to weare on their right Thombes, when they shote their arrowes, for the more strength they purchase thereby

thereby in drawing : for in the posterior part towards the stomacke, it is byoned, & is extēded into a sharpe. Furthermore the more forward that it goeth, the more also it is extenuated, & made sleeker, to the founnyng of the aforesayd figure, thus as in the margent depaynted. It putteth forth no where any roughnes, but onely in the hinder part some necessary Asperitie, seruyng for the insertion of two Muscles there being : which from this thyrd bone vnto the iij. and which are directly caried : as in the Historie of Muscles shalbe declared. And this same bone nature exactly compassed, to the end it might be vnto *Larinx* as a firmament, and foundation, as also a certaine defence, & propugnacle to the rough Arterie: whose begynnyng it is : for vnto it should ioyn together in the inner part, neither could it be enuolued with such hardnesse : whereby danger might oft ensue by swallowyng any thicke, or hard thyng, lest it should presse together the way of respiration ouer stretcht: whereby might come to passe suffocation. Euery where (therfore) this is made a continuall bone, to defend y. rough Arterie more strongly.

The fourth, and fift bone of *Larinx*, *Columbus* calleth that, which the rest haue before him numbred for one, and the thyrd Cartilage. For if as he sayth you shall behold this part, the Membrans being taken of, wherewith it is conered, you shall discern it lose & deuided into two : wherfore he thought god also to distinguish it into two which rise from the toppe of the thyrd bone inwards looking: for to this Tubercle they are inarticulated and knit, and thence from the foundation therof put forth two pinnes or wynges, which are coupled to the lower region of the shield in the fore part, & constitute the rift so needfull to the modulation of voyce : bywardes moreover they tend into y. Procelles, whiche are mutually united the right with the left, & yeld y. Image of a certaine vessel, where with we poure out water to the washyng of handes : & that chiefly (as I suppose) the part of the cloze where water runneth forth, that part therfore the Greekes call *apurovaidis*. These two Officles are vnequall, & together by a Ligament & a Cartilage united, and, by the benefite of the Membran that so plentyfully is added aloft, they seeme to be soft : whereas they end in two Procelles : which nature deuised to vse as certaine litle tongues, not onely to close and shut the amplitude of *Larinx*, and way of the rough Arterie, lest any thyng (especially by vometyng, that might hurt) should slippe into the inner capacitie therof, and so fall into the lunges, but also that the same chynke might be guided, and vfed to the founnyng of diuers voyces: no otherwise then as is seene in Pypes and Shalmes, wherein are put certaine litle tongues, made of two Palates of reed : wherfore the vniō of these Procelles constitutyng this litle tongue, is called *Glottis*.

To these are added one Cartilage no more to be neglected, which is in Greeke *ἐπίγλωττις* because it goeth forth in manner like the litle tounge rehearsed, & labourened to the end that no meate, or drinke flow into *Larinx*: and also is shut and opened, for the mutuall worke of inspiration, and expiration. This imitateth the fashion of a crooked litle Shield, being ample and large in the Superior part, then by litle and litle wayyng narrow, endeth at a poynt : and is inserted to the Anterior and Superior parte of the shield, whence it hath his begynnyng.

**H**ere, in this description of *Larinx*, I imagine that surely the Reader will stand as in a maze, to see that newly called a bone, which heretofore, of all Anathomistes generally before *Columbus*, hath bene taken & described for a Cartilage: but maruaile not hereto so much, for neither hast thou cause, but rather to apply thy senses to the iudgement of the thyng it selfe : that thy owne eyes conseruyng it with the veritie of the thyng, thy selfe also may easely become a witnes in this no doubtfull matter: which by these three poyntes thou mayst easely & quickly discusse: as it were at the first sight, and those are, Colour, the consideration and assay of their hardnes, and the medullous substance that inwardly annoynteth.

Col. Lib. 1. Cap. 13.  
The figure of the third vnnamed bone.

The Asperitie in y. bone for y. insertion of Muscles.  
Why the iij. bone is thus ioune compassed.

4. 5. bone is called the iij. Cartilage with other Anathomistes.

The rift or chynke which frameth voyce.  
What signifyeth Arytanoides.

The vse of the y. procelles of the 4. and 5. bone of *Larinx*.

What is called Glottis.

The Epiglotte what it signifyeth and y. vse therof.

The figure of the Epiglotte.

This surely will seeme a strange description to some.

This meanes to iudge of these whether they be bones or gently.

A consideration of the Epiglotte.

Whence spring y. Muscles moving the tounge.

Why Hyoides hath more ioyntes.  
How Hyoides is bound to the ioyntes of Styloides.  
Hyoides is made of v. bones.

The building of Hyoides construction.

The wisdom of nature, the ioyntes being wantyng.

Col. Lib. 1. Cap. 13.  
Larinx is the head of Alpera Arteria.  
The situation of Larinx.  
The vse of Larinx.

What partes contribute to the making of Larinx.

2. The number of y. bones to Larinx.  
How these two bones meete together in the fore parte.

What parte of Larinx is compared to a shield.  
Lib. 1. Cap. 13.

How the ioyntes of y. Larinx and Hyoides are committed together.  
The iij. vnnamed bone whiche others call the third vnnamed cartilage.



Cap. C. lxxv.  
The principall  
difference of the  
bone and the car-  
tilage.  
It is manifest  
that a thing so  
manifest should  
be omitted of such  
famous men.  
That in apes La-  
rinx is of bones.  
Lib. 1. Cap. 38.  
A great likeli-  
hooe that Vesal.  
dissected & Larinx  
of man.

That Vesalius  
dissected commis-  
sion by the Larinx of  
beastes.  
Nature is every  
where iust.

The structure of  
the backe is woor-  
thy admiration.

The composition  
of the Vertebres  
compared to the  
ridgbeame of a  
shipp.  
Col. Lib. 1. Cap. 4.  
The effect and  
motions of the  
backe.

A further note in  
the composition of  
the Vertebres.

The necessity of  
the backe pious.  
The inconueni-  
ences which the  
backe by this struc-  
ture puenieth.

What the body  
were if motion  
wanted.  
How the body  
should be fenced if  
all Nerues pro-  
ceeds from the  
brazne.

The necessity and  
use of the spinall  
marrey.

How & Nerues  
are distributed.

teth them: which one thyng especially (sayth *Columbus*) distinguisheth, and dis-  
fereth Cartilages from bones: for that the Cartilage altogether, and by the iudge-  
ment of all men, is destitute of any marrey. And by all those iij. thou shalt proue  
this description very true: wherfore if (at any thyng) thou standest at a maruaile  
let it be at this, & I wil be thy mate, that Galen, and chiefly that worthy *Vesalius*  
haue not marked it: for therein neither of them may be excused: since euē in Apes  
(which Galen most dissected) it is to be found bonney, as *Columbus* affirmeth. And  
*Vesalius* professing the proper description of mans body, hath neuertheless (as it  
seemeth) neglected wholly the substance of this part, & yet, that he sought the *La-  
rinx* both of man & woman, greatly appeareth, by that he proueth the shieldlike  
bone (which he calleth *Scutiformis Cartilago*) to beare out in mē more, & in greater  
fourme the in womē. Agayne, who would iudge but that he used so much dili-  
gence, as to discern the difference betwixt the *Larinx* of man & beastes, & therfore  
would describe the right, & not the other. And yet *Col.* (wherfore I cannot a little  
maruaile) writeth that *Vesal.* neglected the body of mā, for this part *Larinx*, & dis-  
sected it of custome in beastes: yea and y in publicke Theaters, wher at he testifieth  
him selfe oft times to haue bene present: but of this perhaps to much, onely y na-  
ture in her works be not falsified: which be every where so wonderful, iust, & true.

And that no where in all the partes of mans body, more exactly, and clearly  
manifest vnto vs, then in the backe: the constructio wherof is not so marua-  
lous, as laudable to the high Parent, & Whogenitor of all thynges. Wherfore, be-  
fore I go forth to describe y singular parts therof, it shal not be onely more plea-  
saunt, but also profitable vnto thee (gentle Reader) first to cōprehend in the depth of  
thy cogitation, a generall sūme, & brief discourse of the creatio therof: which thou  
shalt note to be of the Grecians nominated *πάξις*, and *σῶμα*, the Latins *Dorsum*, or  
*Spina*, which our English phrase termeth the backe: which vnto y trunk of y bo-  
dy is of right a foudation, cōparable to the belly, or ridgbeame of a shipp, or boate:  
wherunto the chief studdes, or postes of the frame worke are moztified.

No lesse needfull to the life of man, is the strange construction of the backe,  
wherby the true ambulatory motion of the body is obtayned. for whereas, back-  
wardes, rounde, or laterall reflection admitted & straight, or vpright station, not  
denied. All whiche we haue by the benefite of the backe, nay rather, for that the  
backe is construct of Vertebres or Spondilles most exquisitely: which beynge al-  
so together mutually concaued, make in them selues by strict Coarticulation the  
close Cloystrer, and safe Gallery for the Spinall marrey: which the Grecians cal-  
leth *σπίναλ μάρρυ*: which to haue bene created was most needfull: neither could it o-  
therwhere more securely haue inhabited. To proue it most needfull vnto the  
body, as euery where we haue professed, note this short Allegation: for we say,  
if it had not bene, one of these y. inconueniences must necessarily haue hapned.  
Either all the partes of the body vnder the head, & Nerues from the brazne should haue bene dedu-  
ced: But if all the partes (as is sayd) had bene frustrated of motion, then had the  
body bene rather as an Image pictured of clay, or stone, then a liuing creature.  
And agayne if a small Nerue proceeding from the brazne, should be deuided, and  
caried into euery part, with such long and vnequall distances, it could not be that  
their force in motion should haue bene sufficient, nor their continuance perdur-  
able. Wherfore, it was farre better that the Spinall marrey, as a riuer issuing  
from the brazne his fountaine, should not onely be elongated after the bodies  
trunk, but also vnto all the partes as it passeth, to send proper Nerues, as the  
delectable fozelkes for feeling and mouyng. And surely so it hapneth: for y vpper-  
most deriuations seeke not out the nether partes, neither yet do the neithermost  
Nerues exalte themselves to the highest iourney, but eche coniugation is aptly

produced to the next partes: as in perusing the Historie of Nerues, you shall easi-  
ly discern.

Soithens that the Spinall marrey vnto all the partes beneath the head, is as it  
were an other brazne, it is no lesse behoufull that it were strongly enclosed with  
some hard and resistaunt muniment, to repugne all injuries, offered to so noble  
a part. Wherfore to commit the same to the tuition of the Spinall bones, nature  
not rashly hath decreed: exculpyng, and grauyng in their substances, fit holes  
for the descende therof: and for that cause is the backe of man constate, and made  
of so many bones, for the more safe keeping: of the marrey: & to fulfill (with more  
facillitie) that manner of euery motion, wherof to the neither partes, that which  
they coneyne is the immediate fountaine.

Besides all this, the Spinall marrey could not endure euery angular flexion,  
nor euery large and sodayne motion: but if the backe should haue bene made of  
large, and lose ioyntes, neither might they haue moued, without great greuaunce  
and hurt: for a Coarticulation made of long bones, is for the cause of a large mo-  
uyng, which in such a place is requisite: but here, considering what is contained,  
it was far more expedient that many should be their number: to euery which a  
little motion should appertaine: so that euery one of them styrring a little, of ne-  
cessitie by that tyme all haue done their duety, the motion is sufficient large, and  
also easie: therfore so, rather then two or iij. bones, reason requireth: for by that  
number (we see by example in the Armes and Legges, the flexion is made An-  
gular, and not Circular: that is to say, cornered, and not compassed: so that if the  
backe had bene in like manner, I meane of ij. or iij. bones constricted, and combina-  
ted, great hurt, ruction, confusion, and continuall compression of the Spinall ma-  
rey must needs haue bene procured, by the dayly motion of such few bones, so  
outragiously vged. Neither can we otherwise cōfigure, but that the small num-  
ber of Bones, should offer ouer readily occasion, vpon euery light motion to be  
dislocated, or rather Luxated: which would furthermore procure great perill of  
lyfe: the which kynde of Luxation that diuine *Hippocrates* well notyng, writeth  
thus, in his booke *De Articulis*. If many Vertebres do fortune at once to be out  
of order, or displaced, it will be very tedious and hurtfull. But if one of them be  
Luxated, and remoued from his fellow, the case then is most pernicious: and the  
reason is, that if one Vertebre be disordered, it so wresteth therewith the Spinall  
marrey, as that it bzgeth it to bowe into a sharpe corner, wherby it is compell-  
ed either to breake, or be bzused: the lest of whiche, is pernicious in deede: and  
deadly, forasmuch as the nature of this marrey, is endewed with the nature of the  
brazne. Whereas contrariwise many Vertebres being luxated, or forced out of  
course, forceth it not so straitly, but into a more blunt bowyng, and Semicircled  
corner: which although it inciteth great distraction, yet not so easely (of necessi-  
ty) endureth death. Wherfore I say, to prevent and forcell all perils, and  
dangerous euentos (so much as might be) for the necessarie, and healthfull pro-  
craftination of lyfe, the backe was construct and made of so many, and so short  
bones, to be made free, if it might be) from such like Luxation: as also that the  
bodies of the Vertebres so effectually made, might (as I sayd before) not swift-  
ly but easely, neither sodenly but softly, be moued euery way: for in deede they  
are mouable, and that aptly to euery side. Galen sayth euery thyng that is vphol-  
den or bozne by an other, ought to be lesser, and therfore lighter then that which  
vpholdeth and beareth: which is the cause, that euermore the vppermost Verte-  
bres are lesser then the neithermost. Wherfore *Os Sacrum* the seate of all the rest,  
likewise excēdeth them all in quantitie.

Hether to how the Vertebres are a safe defense for the Spinall marrey: which  
yet (beyond all that is sayd) we note to haue Processes, & not onely to euery such  
partes

The Spinall ma-  
rey as an other  
brazne.

Why nature co-  
structed the mēis  
of the Vertebres  
to the gardyng of  
y Spinall marrey.  
The Spinall ma-  
rey the fountaine  
of sent to the in-  
feriour part.

Large bones  
moue largely and  
sodainly, but short  
bones moue little and  
easely.

The Vertebres  
beynge short yet  
many in number  
make sufficient  
motion for the  
backe.  
The name is of  
ij. bones & ther-  
fore hath a sharpe  
cornered bowing.

The place of li-  
po. Lib. de artic.  
How the Luxatio  
of the Vertebres  
were to be leuied.

Why the luxatio  
of one Vertebre  
is more perillous  
then of many.  
The Luxation of  
one Vertebre bz-  
geth the Spinall  
marrey into a  
sharpe.

The marrey part-  
icipateth with the  
nature of the  
brazne.

Many Verte-  
bres luxated byn-  
geth the Spinall  
marrey into a  
blunt circle.  
Why the backe  
donly consist of so  
many Vertebres  
Lib. de Viscer. Ca.  
23.

Why y superiours  
are lesse then the  
inferiour Vertes  
bres.

Os sacrum is great-  
er then all the o-  
ther Vertebres.  
The Vertebres  
brazne processes.

The rowe of the  
posterior 12  
cells is called  
Spine.  
The use of the  
processes on the  
sides of the Ver-  
tebres.  
The processes in  
length imitate  
degrees of 12  
degrees.  
The use of 12  
processes of the  
vertebres under  
the ribs.  
The division of  
the backe.

The Vertebres  
of the necke are vij.  
Of the backe 12.  
Of the Loynes 5.  
Of Os Sacrum 6.  
Of Coccyx 4.

The number of  
all 12 Vertebres.  
Which and how  
many are prop-  
per Vertebres.  
Why those under  
Os Sacrum are  
not numbered  
amongst 12  
Vertebres.  
The difference of  
the Vertebres  
after Articulation.  
The necke is  
made for 12  
of the rougher  
Arterie.  
Lib. 8. De Vi. Rat.  
The necke is not  
where 12 Lunges  
are not.

Efflation is the  
matter of voice.

Larynx the instru-  
ment of voyce.

Such creatures  
as want neckes  
are domine.  
Antiole.

Why 12 necke con-  
sisteth of bones.  
Why the necke  
consisteth of 12  
vertebres.  
Col. Lib. 1. cap. 1.  
What is 12 necke.

Some Vertebres  
whereof the necke  
bothe consist and  
one of them diffe-  
ring from another.  
The use of the  
necke.

partes as outwardly occupy the middle regio of the backe (which order is a prin-  
cipall propugnacle to the same marey: therfore the Grecians do terme it *ἀκράβια*,  
the Romans *Spina*), but also other Processeles, which frō the sides of them are pro-  
duced, for the cause of moze ready, and greater safetie: which nature (mozeouer)  
excellently willed to serue for the fired insertion, and due implantation of Mul-  
cles. And as the lower bones are 12 greater, so likewise the Processeles of the higher  
in degree, are the shortest, and contrariwise: the greatnes of the Vertebres, and  
Processeles beneath are wonderfull safegardes to *Vena cœna*, and *Arteria mag-*  
*na*, in their region resident.

But before I start from this generall description, to talke of their particular  
propozitions and partes, I esteeme it not improper, to note briefly vnto you the  
v. partes wherinto the backe is deuised: whereby you may clearly accompt the  
number of the Vertebres, both proper, and improper. These are the v. the  
specke, the West, the Loynes, Os Sacrum, and Coccyx. In the specke first are  
vij. in the West vij. to the Loynes appertaine 5. to Os Sacrum vj. the last 4. are  
of Coccyx: so that by cōputation of all the rehearsed together, they amount to the  
number of xxvij. But vnderstand, that only xij. of them are proper Vertebres:  
by whose vertues the body is turned diuers wayes, and their ende is (as I sayd  
before) at Os Sacrum. And those that are appertinent, or depend vpon Os Sacrum,  
are rather for the similitude, and likenes of Vertebres, numbred amongst them,  
then for any office, or use that they reseyne like Vertebres: for those in deede are  
right called Vertebres, that with one kynde of Articulation are together cōpoun-  
ded: which is called *Arthrodia*: where as the other (therfore not proper) are de-  
nited per *Symphysin*: as most clearly we will endeuer henceforth to handle.

First of all we will (as order requireth) begin at the specke, which is called in  
Grecke *ἀκράβια καὶ τραχύλος*. Which was stretched, and elongated frō the body  
for the cause of *Aspera Arteria*, as Galen proueth: saying further, that the specke  
alway peristeth with the Lunges: wherfore euery fith that wanteth the Lunges  
is also destitute of a specke: and contrariwise, such as haue Lunges haue also a  
specke: and both haue inspiration and expiration, by the rough Arterie. Whitherto  
also efflation, which is the immediate matter of voyce, is the action of the same  
Arterie: without the which, voyce could not be made: and the upper end of which  
(beyng of the Latins called *Laringa* or *Larynx*) is the chief, and most principall  
fourmer of voyce. Wherfore it hauyng such affinitie with the Lunges, and ser-  
uyng to so notable use, it is euident that the specke was fourmed for the cause  
thereof: and (goynge further) he sayth also playnly, that such creatures as want  
their speckes are domine and mute. And Aristotle sayth euery creature that wa-  
nteth Lunges wanteth a specke. Then fith reason leadeth vs, that the head is di-  
staunced from the body so much in man, for the cause of *Aspera Arteria*, and  
voyce, and that the erection of the same specke could not be made firme and sted-  
fast, without the supposable ground and frameworke of Bones, neither moua-  
ble, had the same bene of such solid continuitie, as should haue resisted the meane  
of motion, which nature therfore construed of sundrie Vertebres, you shall heare  
what space is to be vnderstanded by the name of specke, and what bones apper-  
taine to the construction thereof.

The specke is all the part stretched forth betwene the Head and Shoulders,  
that is, from the foundation of the Scull to the toppe of the West: which in that  
space containeth the number of vij. Vertebres, or turning Ioyntes, eche one di-  
uers, and different from another: that is, the first from the second, and those a-  
gayne differing from all that folow: but the iij. that are from the second vnto the  
the seventh, are about all the rest most likely figured and the seventh it selfe di-  
stinct from all other, as shall appeare. But first is to be noted, that the specke  
was

was not onely ordained to the end to beare, and susteine the Head, but most espe-  
cially to be auaylable to the diuerse actions, & mouynges therof: which kyndes  
are not all proper, nor all common: but some motions properly appertayning  
to the Head, and others common, which are obtained by the mouynges of the  
specke: wherfore *Columbus* sayth, we iudge the proper mouyng of the specke  
to be common to the Head: soasmuch as the specke cannot moue, without the  
styring of the Head. Galen assigneth to the Head two peculiar motions: one is  
by the mouyng of the Head forwarde and backward, and the other by turnyng  
it round to the sides: which may be done, the specke remainyng quyet, or not la-  
bouryng: but when the Head is greatly moued, downward, or vpyward, or vhe-  
mently inclined to the Shoulders, such cannot be the proper motions of the Head:  
seing that they are done by 12 labour of the whole specke, or otherwise cannot be.  
Wherfore the proper motiōs of the Head are brought to passe, by 12 meanes of  
the first & second Vertebre: which ij. of all others, are most especially Colligate,  
& bound to the Head: for frō many partes of *Occiput* slowly Ligamentes: which  
is the cause, that in Children the same is construct of many bones, and therfore  
hath many riftes, whence they are in the beginning produced: but tyme weareth  
them to farre forth of sight, as not onely one cannot be discerned, but also euery  
one acknowledgeth it a bone, without distinction. After this sort it is to be gathe-  
red, the Ligamentes are in *Occiput* engendred: that is to say, in diuerse places: &  
so by the annexed to the first & second Vertebres, then consequētly to the specke:  
as neither this way, nor that way, the head may sodainly or vnadvisedly slippe.

And to make you moze clearly conceiue in your mynde, the exquisite maner  
of motions of the head, I will let you vnderstand, in what sort *Occiput* is Artic-  
ulate vnto the ij. first Vertebres, as thus. In that part of *Occiput*, wherein nature  
hath insculped the large and ample hole for the descense (as is sayd) of the Spi-  
nall marey, there are towardes the Anterior part therof, ij. Processeles, or outgo-  
yng pozitions, that is to say, on eche side of the hole one: which are receiued in by  
the proper cauities of the first Vertebre, made in the vpper part & middle seate  
of the ascendēt Processeles thereof, by meanes of which Articulation, the Head is  
now inclined, and now reclined. From the middle of the second Vertebre riseth  
a certayne round and long Processele, indifferently thicke, called in Grecke *ὀδόν-  
τος*, and *ὀδόντα*, and for the figure and shape therof, likened to the kynde of tooth  
in mā called the dogge tooth: this is likewise receiued into the cauitie of the first  
Vertebre, prouided on that side also for the same purpose, excluded larger from  
the side of the common hole, whereby the marey is sayd to descend: and because  
the whole body of the sayd Vertebre, for the large compasse that by this meanes  
it is hollowed, should not be wholly puiuated, nor the passage for the Spinal ma-  
rey marred. In the same place (therfore) nature hath in such wise lapped, and  
fastened to the tooth a solid Ligament, as that the comyng downe of the marey  
can neither be broken, nor in mouyng compressed: and yet the Articulation not  
left to straye, but slacke enough: as it behoued, for the turnyng of the head on  
eche side: which is thus brought to passe by the Dentall Processele of the second  
Vertebre, wheruppon the fith easily turneth.

By this it is euident, which are the proper, and which are the common moti-  
ons of the head: and how with the one, the other are made also: although to their  
mouyng, the continuation of the Vertebres with the head is necessarie. Wher-  
in Galen is much reprehended, for attributyng the inclinatio, and reclination of the  
head, to the cause of the second Vertebres mouyng, and of the dentiforment Pro-  
cessele: so the side way turnyng to be brought to passe by the first Vertebres Arti-  
culation with the head: but that is not so sayth *Columbus*: for the first ioynt ma-  
keth the noddyng vp and downe of the head, and the second the circumnation to  
eche

The necke hath  
motions prop-  
per and common.  
12b. 1. Cap. 15.  
The necke can  
not moue with-  
out the stirring of  
the head.  
Two motiōs pe-  
culiar to the head.

How greater mo-  
tions are not pe-  
culiar to the head.

By what meanes  
the proper mo-  
tions of the head  
are made.  
Why *Occiput* in  
children is made  
of many partes.

The head is  
most firmly toy-  
ned to the necke.

How *Occiput* is  
lunited to the two  
first Vertebres.  
How hapneth 12  
inclination and  
reclination of the  
head.  
What is the pro-  
cessele called *Odón-  
tos*.  
The description of  
the Articulation of  
the second Vertebre  
with the fith.  
The industrie of  
nature.

The Ligament of  
the Processele cal-  
led a tooth, and  
the use therof.  
How the circum-  
duction of 12 head  
is brought to  
passe by the arti-  
culation of the se-  
cond with 12 fith  
Vertebre.

Gal. Lib. VI. part. 1.

Galen falsly suppo-  
sed the inclinatio  
of the head to be  
by the composition  
and hynnyng to-  
gether of the fith  
with the second  
Vertebre.

That the head is  
not circumducted  
by the articulatio  
of the head with  
the first Vertebre  
Agayns Galen.



The second turning ioynt (beside the tooth that riseth in the middest thereof to  
be



for they are deeper engrauen: in the vpper part of the lower bone, then in the inferior part of the higher bone: whiche vnto the diligent beholders, is easie to be discerned.

Where I haue spoken generally of the Vertebres, I haue not there left untouched, those iij. betwene the second, and the seventh: which (as I sayd in the beginning) are most like one an other.

Therefore passing them, we finde the seventh, (which is the last of the necke) finite, and next adioyning to the Vertebres of the brest: and that so, as it seemeth to participate much with the nature of them: and therefore from the superior Vertebres playnly differeth: for the posterior Processes of the foure above it, are clouen, as is aforesayd, but this is whole as I haue found yet Col. sayth it is most commonly otherwise. Besides this, the inferior part of the body thereof that meeteth with the first Vertebre of the brest, extendeth not downwarde so obliquely as the rest, but meeteth with the toppe of the next body somewhat with more flat: and equall playnesse. And thus much as touching the turning ioyntes of the Necke.

That part of the backe which constituteth the brest, being that which in deede the common sort of people call the backe, for the most part consisteth of xij. Vertebres, or turning ioyntes: to euery of the whiche, two ribbes are knit: that is to say on eche side one. So that the number of them is xxij. though sometime one is found wantynge, or aboundynge: but that selde, yet more often aboundynge, then wantynge.

These of the brest do differ from the Vertebres of the necke in largenes, although the others excede them in thicknes, and soliditie of substance: and their largenes was conuenient: for it behoued the vppermost susteined, to beare a lesse scope then the vppermost sustenting. But this marke, that those that are augmented with larger copasse, are somewhat the more of light and hollow substance: yet accept not this for all the difference betwene them, for besides they are different both in figure, and situation from those of the necke: that is, they are neither so flatte (yet I thinke good if you will to except the two first of the brest) nor yet so seppressed as those we haue spoken of (without it be the vppermost whiche is most of all other like the seventh of the necke) but doe protuberate round, and swell inwardly in the midst. Also the bodies of these above, and beneath, are playne, possesing eche one a thicke crust of Cartilage, interiect and put betwene them. Neither is their posterior Processes (as those of the necke) clouen, nor yet their extremities broad, or round: but long and sharpe, after the manner of a foure squared pillar, or auncient monument called *Pyramis*: whiche being broad beneath, is squared vp to the toppe sharpest.

Neither are the transuerse Processes biforked or guttured, but long, and great, ending with round and thicke heades: whiche rising also from the sides of the Vertebres, doe erect their exorture vpwordes, but towards their heads are reclined downward: their inner sydes being hollowed: that is to say, hauing proper canities to receiue the heades of the ribbes, are so obtained for the cause of such Articulation. And those canities are in the neither region of the first three but in the vpper region of the last three, the middle iij. admitteth them in the midst. Contrariwise, the transuerse Processes of the xi. and xij. are not like: for to them (comprehending but the false ribbes) such strong alligation, as is vnto the rest, was nothing so needfull. Therefore the false ribbes are committed to the bodies of the Vertebres, as ready alway to giue scope to the guttes, but with a meane, and single Articulation. All the rest are knit with most strong Ligamentes: and yet more, (to the ende that their turning might be more firme, and steddfast) in the bodies of the Spondilles on eche side, or canities, or hollowes, wrought

wrought (although not all after a manner nor lyke situation) to admit into them the little heades of the same ribbes. But their differences in this respect be these: For the first, eleuenth, and twelfth haue canities exclyped in the substance, and middelt of their bodies, whereas to all the rest, they are common to the extremities, and enter partes of them nere to the holes prepared for the Sinewes production.

As touching the substance of the Vertebres, note, that the lowest and greatest (as is sayd) are rarest and most spongie above the rest, which in these of the brest is euident: so that sufficient playnly, they are in that point, frō those of the necke distinguished: Furthermore the posterior Processes (which throughout longitude of the backe proceeding, are called the Spine) of the two last Spondilles are not (as the rest) so sharpe, neither yet so long, nor slender, but broader, and rounder ended: and as they differ from their mates of the brest, so are they unlike (also) those of the Vertebres of the loynes: constituted in the same volve and order: but most unlike all others of the backe, both above and beneath, is the lowest of the three, being the xi. and last in number of the brest: which is shortest of others, and neither vpwordes nor downwarde tending, but directly put forth.

Here now we are not to pretermitt so notable a matter, as is yet to be spoken of by the Vertebres, which Galen describeth for the tenth: though more truly in Dogges and Apes, in which creatures the tenth in the middelt of the Vertebres of the backe, & as the point of Arctura: which wholly resting, all others one eche side moue, which thing shall truly be proued in the xij. Vertebre of mā, which purchaceth one ether side an equall kinde of Articulation: that is, both above & beneath it hath Processes putting forth, so it might be on both sides receiued, inst contrary to the first Vertebre of the necke, which (as we haue spokē before) on both sides receiue. But if any mā, of any varietie of this Articulation more diligently enquire the reason, let him consider, how that in the superior Vertebres one kinde of mouing is obserued: but in those beneath the xi. a contrary. Therefore a contrary manner also of articulation in respect of the inferior, is to be sene in the superior Processes. And peradventure sayth *Collibus* (but oh how excellently was that noted) the Articulation of the precedent Vertebres is most apt to bow the backe towards the Anterior partes: whilst the same agayne almost with the whole body, cracking to the posterior partes, that giste is purchaced from the Vertebres of the Loynes.

Lastly these Spondils are, all by ascendent & descendent Processes committed & knit together: being obliquely cut, & intercrossed with Cartilages. The Vertebres of the necke after Gal. 13. V. part, haue xj. Processes or produced portions: which are so in deede, if you accept the laterall Processes double, which before I haue affirmed not to be thorough out clouē, but rather made like a spoute, or gutter of lead, which frō betwene y. houses conueyeth the water readely: or els but as y. ascendently produced in the vpper part on eche side of their bodies, by whose meanes (as I haue before copared the) the neither part of the superior sitteth in the vpper part of the inferior, like as in a fished stole: y. ascendent, and y. descendent, y. transuerse or laterals, & one backward, being the spine or ridge: which reckon more woorthily (if the transuerse Processes be subized two a piece) to be double accomplished: especially the fourth middlemost: whose endes are alwayes biforked, and deuided.

But the produced partes of the pedozall Spondilles, *Vesalius* witnesseth to be v. in euery one: as two transuerse, two ascendent, two descendent and the spine, or posterior Processe.

Onely the xi. of the brest (in such bodies as it is founde as it were confused as I not seldom haue inuented) hath the transuerse Processes deuided, the one declining downward, and the other reclining vpwordes: after the same sort as hath the Spondile following, though not so large. Which is appertinent vnto the Loynes, which now we will speake of, whose turning ioyntes we accept in

What canities haue the first 11. & 12. Vertebres.

The substance of the Vertebres.

What kind ones are the posterior Processes of the Vertebres of the brest.

The 12. and last of the Vertebres of the brest, what kinde a one.

The 11. Vertebre to be the middle of the backe in the body of man. The 12. figure of the 12. Vertebre.

The 12. Vertebre is on both sides receiued.

The first Vertebre on both sides receiue.

Why one manner of articulation is not to all the Vertebres of the brest.

How the back is bowed forward.

Why what meanes the backe is crooked towards the hinder partes.

How by 25. points both ascendent and descendent the Vertebres do also meete.

The number of the Processes of the necke.

How they may be numbered nine.

The 11. middle most Vertebre seemeth more vnto the laterall to be accomplished.

The number of the Processes of the Vertebres of the brest.

The transuerse Processes of the 12. Vertebre appear in forme as though the head thereof were surrounded with some vigorous continu.

Of the v. turning ioyntes of the Loynes.

Now is it to be noted, that such length in y<sup>e</sup> Processeles traſuerſe of the Loynes, was ordained to be as propugnacles ( in ſtead of little ribbes ) to the great veſſell, or ſpoutes, deriued from the fountaines of life and naturall being : and not to be produced after the iuſt length, and magnitude of the ribbes: for their extension ouer the region of the bellye had not bene conuenient , neither would haue giue place to the labour of the Muſcles , in making compreſſion for the expelling of excrementes: but in women leaſt of all expedient, as in the tyme of naturall procreation, reaſon ratiſieth. It was ſufficient therfore, that the production of the laterall Procesſes of the Loynes was ſuch , as might only giue defence to the great Arterie, and hollow Veyne. Here vnto theſe Procesſes, & not farre from the holes of the Serues, ariſeth on ech ſide one other produced portion, though farre ſhorter then the reſt. Therfore in ſome bodyes not eaſely diſcerned : whiche was the cauſe that *Veſalius* neuer inuented them. Moreover the poſterior Procesſes of the Vertebres of the Loynes are neither ſo long and ſharpe, nor ſo much declining downewardes , as the ſuperiour Vertebres beſore deſcribed , but ( though not in riſing ſo large ) yet in proceeding broader, throughout their length ſtronger, & their extremities compaſſed in circular ſort. Alſo theſe Vertebres of the Loynes haue Appendances , like vnto the reſt, but onely as they ſurmount in quantitie, that is in magnitude aboue the reſt, ſo the ſoft Cartilage interſiſted betwene their bodyes, is ſo much the greater and thicker: their holes likewiſe, exculp'd beſore the ſuperiour and inferior productions, giue entraunce, aſwel to the nutrimentall veſſelles , as to the tranſporters of ſenſe produced from the Spinall marrey. Notwithſtanding we finde not theſe holes ſo roūd as theſe ſuperiours, nor more largely excraued in the vpper ſide of the inferior Vertebre then in the lower part of the ſuperiour Spondill, but much larger then the holes of the beſt and necke as their bodyes we haue ſayd beſore are larger.

Col. lib. Cap. 17.  
A thing common  
to all the Wor-  
bies the first of  
the nation chiefly  
excepted.

The Spinnall marrey passing the rough Os sacrum rather of a fine we nature. The nerves from Os sacrum to the haunches and some exiles of the things. Now the holes of Os sacrum are made. The lower & lesser are the holes. The holes on both sides of Os sacrum lesser with one and greater within. The figure of Os sacrum. To what use is the hollowed thereof, or the bending of Os sacrum inward. Where Os ilium is knit to Sacrum and how. That Os Sacrum and ilium cannot move. The last portion of the back called Coccyx. Now the 4 bones of Coccyx depend upon Sacrum. Why it is called Cauda. Why it is called Coccyx. The description of the first bone of Coccyx. The description of the last 3 bones of Coccyx. Coccyx sometime floweth by motion. Whilſt Coccyx is bowed the woman is pained. The 1000000 of the first bone of Coccyx. Coccyx containeth not of the spinall marrey. The substance of Coccyx. The colour of the bones of Coccyx. The bones of Coccyx are in childen as soft as gellyt.

It is much doubted that Galen never dissected the body of man.

behoned) from the Spinnall marrey: contained in the concauitie hereof, as is serie in other Vertebres: But here, that is beyng in *Os sacrum*, it is of thicke, and like a hard substance, as that it seemeth to tast more of a Sinele substance, then of the nature of marrey. Wherfore in the end, degenerating into many branches of *Perues*, going backwardes from the borders of *Os sacrum*, it is strowed outwardly in the haunches, & disseminated among the Muscles of the thighs as largely is set forth in the History of *Perues*: their holes are round excaved, as much in the substance of one side, as an other: like as before I sayd of the Vertebres of the Loynes: and the uppermost two greatest, but the further from them the lesser: so likewise beynd (for the holes of *Os sacrum* do penetrate cleane through the substance thereof, as well as into the concauitie of the marrey) they are nothing so large as in the inside before. To describe of *Os sacrum* the fashion, note that by per part of the body therof is playne, where it meeteth with the 6. Vertebre of the Loynes: but on eche side, it stretcheth forth with a great thickness to the meeting of *Os ilium*: and going downward, it tendeth backwardes to the middle Commisure, and so forward agayne: becoming more narrow, and sharpe, the further from the toppe, descending to the end: whereby it is made hollow before, & boiſhed forth beynd, in which hollow part of it the bowels is notably contained: the posterour Processes are short, & together committed as the sides. At the sides of the these uppermost bones of *Os sacrum* beyng broad, sufficient Solid, and halowed, are affixed and knit the prominent partes of *Os ilium* one eche syde, which by the interuenture of Cartilages, and Ligamentes, are so safe connected and bound together, as very hardly they may be deuised. And that which is more, they are sometime founde growne together, so that no instrument may disseuer them: which is an euident token, and playne pofe in deede, that neither *Os ilium*, nor *Sacrum* may moue by any meanes.

The fift and last portion of the backe which heretofore we haue nominated, called *Coccyx*, is contructed and made of iij. Ossicles, or little bones, which depending upon the extremitie and neithermost part of *Os sacrum*, like a tayle, is heretofore of the latter writers named *Os cauda*: whiche the Grecians call *Coccyx*, because it somewhat resemblith the beke of a Cuckowe: being also towards the end, euermore sharpe and narrower, together with the crookednes. The first bone of *Coccyx*, beyng broader then the rest, hath in the bypper part therof a cauitie, sufficient to receiue the extreme end of *Os sacrum* and so is coupled with a Cartilage: the other iij. likewise beyng more round, are after such sorte committed together, as that, when need requireth, they might shew a certaine kynde of mouing: which *Columbus* affirmeth to bolue (though not without great payne) in womē, at the coming forth of the byrth. Foure Processes apperteyne to the first bone: as two laterall, or on the sides, and other two beynd, sharpe, and bywardes reclinyng: these bones haue no place within them for the Spinnall marrey: wherfore neither haue they holes, for the transmission of Sinewes: their substance is hollow and light, like as the Vertebres of the best: their colour is red: and in Children as soft as gellytels.

Galen description of the last two partes seemeth wholly reiected, in notyng these bones to *Os sacrum*, and iij. to *Os Coccyx*: so much, that no man beleueth he euer dissected the body of man: but who is so ignorant that knoweth not, how euē in one region, great difference, and sundry alterations in natures shapes are found: since I haue to shew in my house a skeleton, which were the bones sometime of a tall man, whereby I am able to appoyne as much (to the admiration of all Anatomistes) as Galen affirmed as touchyng the backe, for whereas the most famous dissectors, and princes of Anatomy, haue bowed fine Vertebres to the Loynes, b. (but most commonly bj.) to *Os sacrum*, and foure to *Os Coccyx*,

myne

myne hath neither of all those true: but contrarywise, bj. to the Loynes, iij. to *Os sacrum*, and onely one to the taylebone. I write not this to the defense of any error, but that eche one, delibly waying the alterations of natures, and nations, should be more studious them selues to write the truth, then greedy to reprove, whose ates they neuer saw.

Thus with a sufficient prolixitie, we haue entreated of the Vertebres: whiche for because xij. of them are sayd to constitute the best (which is the mansion of the heart and spirituall partes, or (as *Euchytus* sayth) a certayne strong enclosure, so circundated and compassed for the safe keeping of the hart and Lungen) it is fitte to describe now in what order.

It seemeth nothing at all disagreeing to truth (by the Assertions of sundry authors, inferred on this behalfe) that the construction of the best consisteth of iij. thynges: that is to say, of the Vertebres or Spondils, of the best bone, & of ribbes. in which creation, the diligēce of nature was meruaylous as Galen declarerth in his 7. *De Viti part.* in not making it altogether bonnye, or fleshy, but by the mixture of both: for if of bones onely, the best had bene utterly destitute of mouing: And contrarywise, if of Muscles without bones, it could not be but by contractio, to fall upon the heart, and lungen, hauing nothing to sustaine and hold them by: but by this meanes, both the best moueth, by the benefite of the Muscles inter sited among the bones, and the Muscles are susteyned: also the strength of the bones, which are extended with such ample scope and conueritie, are most expedient for the secure beyng of the heart and Lungen: otherwise all the members must haue yelded to voyce and respiration: which by this meanes, are most notably achieved, together with competent compass, and make room for the magnitude of the heart & lungen: which (as testifieth *Euchytus*), imitateth the fourme of the best, but not the best of the Lungen.

Wherfore, to the constitutyng of the frame of the best, as the ribbes are the principall partes, so *Columbus* proneth the aforesayd Vertebres, that is from the last of the necke, to the first of the Loynes, to be of more efficacie to the strength of the best then the best bone. For to the (sayth he) the ribbes are coupled (almost all) with double knittynge: and therfore receiue twise so much strength from the Spondiles, as force from the best bone: the number of these ribbes are xxiij. that is, on eche side xij. and this we accept for the most part: although (sometime) they may be found more in number, or fewer, as well in men, as women. Wherfore to dispute with the impudencie of such, as will haue the womans side in number of ribbes, to surmount the mans, it should be extreme madnes and follie: for more in number, or fewer, hapneth onely by the abundance or want of the matter of generation: no otherwise the as sometime we finde more, or lesse then five fingers on a hand. Also we must note, that by the extraordinary number of Vertebres, may grow the like effect in accompt of the ribbes.

But to speake of the number which most commonly we finde: that is to say on either side xij. of the whiche number there be certaine named *True* and *Legitimate* ribbes, and others false and counterfeit ribbes: those that are nominated to be the true and perfect ribbes, are the byppermost vij. because they are knited, by a Cartilage going in the middelt to the best bone by the manner of knittynge called *Arthrodiu*, heretofore sufficiently defined: five ribbes following these are the vntrewe ribbes, because they are not conioyned in the order of the rest to the best bone, but are committed onely to the Cartilages of the superiour trewe ribbes: the xij. alone by it selfe refuſeth to be fastned with the rest, and therfore is stayed and bound to *Septum transversum*: neither meruaille, if sometime you finde the xij. in that sort colligate to *Diaphragma*.

The ribbes (as I sayd before) are with a double tyeng carticulate to the

xiij.

Vcr.

A backe very strange from that whiche is before.

I doe not defend Galen in this, knowing that he hath erred much in p. 1000000, but to give the figure how incorrect their number is in most bodies. The best is the mansion of the heart.

Cap. xxiij. lib. 1. The construction of the best consisteth of three thynges.

Galien in p. construction of the best very wise and poudent. Why the best was not made all of bone.

Why the best was not made of muscles without bones.

How true is the right construction of the best.

At the best had bene made with one bone what discomfort had hapned.

The lungen imitate the fourme of the best.

Lib. 1. Cap. 23.

Lib. 1. Cap. 19. That the best hath more strength from the Vertebres then from the best bone.

Almost all the ribbes are double knit, to the Vertebres.

The number of the ribbes.

The ribbes are not always 24.

That the man hath as many ribbes as the woman.

The reason why the ribbes are in some more in others fewer.

The number of the ribbes is answerable to the number of the Vertebres of the best.

The diuision of the ribbes.

Which be the trewe ribbes.

Why they are called true ribbes.

How the 11. last are tied.  
The 12. process of the ribs in the posterior part.  
The cartilages in the space of the Vertebres.  
In other process in the ribs.  
The use of the other process.  
Where this of the process is tied.  
What ribbes want the second Articulation.  
What tying is common to all the ribbes.  
The Appendances of the ribbes.  
How much space the ribbes have of bony substance.  
Where the Cartilaginous substance is produced to the ribbe.  
The use of the Cartilages between the ribbes and breast bone.  
Of the substance of the ribbes.  
The extremities of the ribbes.  
The middle part.  
Towards the breast the ribbes are broader.  
To know if right from the left ribbes.  
The ribbes of a Lyon are not flat but round.  
The Cartilages of the ribbes are harder than of the false.  
Why the greatest of the ribbes are harder.  
The harder are bound to the harder parts & contrariwise.  
The Cartilages of the ribbes in old persons doe participate with the nature of bones.  
In length the difference.  
The Cartilage of the last ribbe is widest.  
Wherein the last cartilage differeth from the first.  
The first Cartilage and ribbe is broadest.  
Why the ribbes have such long Cartilages.

Vertebres, all saving the 11. last : which be in single sort committed to the Spondiles: The endes of all the ribbes backwardes are prominent, like unto headed Processes, or productions, rather sharpe, then round: the which heades are immit- ted into the bodies of the Vertebres: There are also in the sides of them (for the purpose) certaine cavities, diversly apparant: for nothing so deeply creased are those, of the thide neither most ribbes serving also to their articulation: they are not so firmly knit to the Vertebres. They have besides this, not farre from the head, an other Process, (the space therfore betwixt both is left hollowed) and this Process luttynge forth like a knot in a piece of wood, is a meane to give the ribbe an other stay: for it is fast tyed also, and that with most strong bondes, unto the transverse Processes of the Spondiles.

The which manner of knittynge (notwithstanding) we must not accompt common to all the ribbes: for the xi. and xij. yea many tymes the first also, are depriv- ed of this second Articulation: yet this is comon to all the ribbes: that is, to consist of bonny, and Cartilaginous substance, as also to be ended with Appen- dances, as well where they couche with the cavities of the Vertebres, as also are connected to the transverse Processes. The whole space of them, from the Verte- bres, towards the Anterior partes, is of bonny substance: but the true, in coming to the breast bone: and the false, to the gristles of the others, yeld forth great stoe of Cartilaginous substance: to the end that the softer with the hard, might not sodainly be compounded.

Howeover the offes substance of the ribbes is not euery where alike: for the extremities and endes of them are tender, light, & hollow, but middle part much harder, and also inwardly modulous: so also, that part, that is next to the Ver- tebres, is ever more narrow: and as it were round, in comparison of the other space nearer to the breast, which on each side, are made more broad, and flat. Colum- bus distinguisheth the right from the left, by the thickness & thinnes of the partes: For (sayth he) for certaine note, that the superiour part of euery ribbe, is thicker then the inferiour: and not onely in man, but likewise in all other creatures (the Lyon excepted) he affirmeth this to sound with truth. Furthermoze the Cartila- ges, which the ribbes forwardly produce, are diuerse, and not of equal soliditie in substance: for those of the true ribbes, are not so soft as the gristles of the false ribbes, and that for good consideration: for the one is committed to a harder sub- stance, the other to a more soft: as is manifest in the uppermost or true ribbes, whose Cartilages are fastned to the breast bone, whereas they of the counterfeite sort are but tied to the Cartilages of the others. Wherefore, the softer with the softer, and the harder with the harder partes better to indure, and more safely to knit, who is so ignozant that doubteth. And that which is more, you shall finde in very old persons, those superiour Cartilages belongyng to the true ribbes, not as we haue sayde before, but to be into offe substance (that is the nature of bones) degenerated, and changed.

Amongest the rest, the vi. vij. viij. and ix. Cartilages of the ribbes, are longest, but those of the false ribbes more slender, and narrower pointed: which is not so of the true ribbes. Notwithstanding the Cartilage of the last is shortest of all, like that of the first true ribbe, except in this differing, that whereas that is sharpe and slender, contrariwise this is ample and broad: no otherwise then as it sur- ceedeth all others in breadth: and that principally, towards the part, therof that nearest approacheth the breast bone: and that farre otherwise, then hapneth in all the rest, whose beginninges contrarily, are broader then any other portion of their progresse. Such Cartilages are requisite unto the ribbes, yea and very need- full, not onely for the easie motion of the breast, in being extended and compres- sed in the sleepe, after the naturall motion of the Lungen, but also for the better

saferie

saferie therof, from outward, and extrinsecall annoyance. For by their meanes, eche sodaine percussion, or stroke of the breast hath an easie repulse, in their yel- dyng from it: which otherwise might breake the ribbes, or at least denide them fro the breast bone. But these, occupying the meane space betwixt the ribbes and breast bone, are by expiration indented, but by inspiration extended. Likewise, the vi. Cartilages of the superiour ribbes are equally distanced, but the compasse of the viij. viij. & inferiour part onely of the vi. where it respecteth the viij. are diuers, and variable, and their Cartilages to cleane together, as they might seme conti- nuall: leauyng no space, where to be separated.

Beyond all this, eche Cartilage appertaining to the true ribbes, hath in the end therof, as it were a certaine head, or Tubercle, whereby they are committed, & ioynly knit unto the corners or cavities, ensculped in the sides of the breast bone.

To speake of the figure of the ribbes, or what kynde of fashion they haue, no man is ignozant: onely this is to be noted, that the semicircled order of the ribbes, and compassed creation of the breast were most expedient, as well for the force and strength therof, as also for the matter containyng of many thynges: and so conse- quently, for the better saferie of thynges contained.

The first superiours, and last inferiours, being farre thozter then the middle- most, to the roundyng and compassing of the breast do not a little lend (as it were) their helping handes. Wherefore the obseruation therof is worthy: since the up- permost are more crooked and bendyng then the neithermost, which are nothing so bunched outward, nor strapt: the middlemost againe, being more long, and large, are also broader then the rest, except it be the first of all, which as it is shor- test, so it is also most broad: whereby we gather, that by the strapt coming in and bendyng of the uppermost, the breast part also of the breast is made the narrowest, and straptest of some, but againe further goyng downwarde, where the ribbes are largest, and more at libertie extended, there also the breast must needs haue greater scope, and compasse, as it behoued.

Now againe because the ribbes, in their inner region or side, are succinged and clothed with a most sensible Membran called *Pleura*, and to the end that, the asperitie and roughnes of the ribbes, might not be at any time, to the sensibillie of the same, offensant, it was therfore carefully provided for, they being inward- ly, wrought so smooth & easie for the same as may be deuised. There is a certaine hollow, or long cauitie in the lower region of eche ribbe, which lyng after the length therof like a gutter, yeldeth way for the course of Veyne, Arterie, and Nerue, therein runnyng together. And this manner interne cauitie is indifferen- ty in all the ribbes, onely stretchyng longer and deeper in the middlemost: but the first & extremest ribbes, admittynge smaller vessels, for the smalnes of the ribbes, haue likewise lesser cauities or gutters, to their substance engraued. Where- fore, for this cause, we are most excellently warned, in the disease called of the Grekes *Empiema*, that in makynge incision for the drawyng away of *Pus*, we be sure to apply our instrument to the upper region of the ribbe, but not to the nei- ther part therof in any case: for feare of the great incommoditie, that might en- sue by deuiding those vessels: which (as appeareth in the lower side of the ribbe) are easie to be touched.

But outwardly the ribbes (I meane in the posterior part of them) are suffi- ciently rough, and unequal, for the better fastenynge to of the Ligamentes, whereby they are alligated to the Vertebres, in that order as we haue said before. But not far fro those Tubercles or productions, which we haue nominated to articulate with the transverse Processes of the Spondill, the ribbes are ended with an- other prominent portion, whereto groweth the longest Muscle of the backe: and not far thence, in a rough part of the ribbes (for so is the whole space of the fingers

ix. and

ix. and

The figure of the Cartilages in the inspiration and ex- piration.

The spaces of the ribbes.  
The tying to- gether of the Car- tilages.

How the Car- tilages of the true ribbes are knit to the breast bone.

Every man know- eth the fashion of the ribbes.  
To what use the breast was made compassed.

The cause why the uppermost and the middlemost ribbes are longer & the middle sort longer.  
The uppermost ribbes are more crooked.

What kynde of ones are the middlemost.  
The last ribbe is longest and broadest of all others.

Membran clothed the ribbes on the in- side.

Why the inside of the ribbes is not rough.

A Veyne, Arte- rie, and Nerue, what cauitie in the ribbes receiue them.

The cauities of the ribbes com- pared together.

For the disease Empiema how in- cision must be made.  
What hurt may ensue by making incision vnder a ribbe.

The ribbes on the out- side, rough and why.

The longest Mus- cle of the backe.



The insertion of  
the bone in the  
sternon.

Sternon, i. pectus,  
the breast bone,  
which is rather  
the region of the  
breast.

Of how many  
bones the sternon  
consisteth in o-  
ther creatures.  
Galen in cronie.  
The breast bone in  
man of what parts  
it consisteth.

Lib. 1. Cap. 19.  
The description of  
the first bone.

The description of  
the second bone.  
The third bone,  
wherefore it is  
knit to the breast.

Macrona Carti-  
lago where.

Of the substance  
of sternon.  
How the breast  
bones are bound  
together.

Col. lib. 1. Cap. 20.

The breast bones  
are united toge-  
ther by Symphysis.

The breast bones  
move after the  
motion of the  
ribs.

The cartilage yeel-  
ing to the defense  
of the rough arte-  
rye.

The cartilages ad-  
mitting the heaves  
of the cartilages.

The toppe of the  
breast bone rough  
to what enoe.

At the lower end  
of the breast bone  
groweth the no-  
table Cartilage.

The figure of  
this Cartilage.  
The names of it.

Why this Carti-  
lage cannot defende  
the mouth of the  
stomache.

The mouth of the  
Ventricle is near  
the backe.

The use of Ma-  
crona Cartilago.

A wound in Ma-  
crona Cartilage in-  
ferreth death.

breast from the Vertebres) is aptly inserted the vi. Muscle of moving the breast: and thus are the ribbes committed to the Vertebres.

The breast bone, which the Grecians call *sternon*, and *sternon*, but in Latin *Pectus*, is farre otherwise in foure sort of beastes, and much alienate from the naturall construction of the same in mankinde: for that in Dogges, Apes, & other such lyke, it consisteth chiefly of vii. bones: which perhaps dzew Galen to that error, as appeareth in his xiii. chapter of bones: but the breast bone in man is construct and wrought of foure partes, that is to say, of iiii. or iiij. bones: but not so many as are true ribbes on a side: which (I say) in beastes, & not in men, are found. *Vesalius* found but thre in aged persons. Whereof the first is very large, and also thicke, but not so thicke as might surmount the largenes, & broader in upper part then where it meeteth with the second. The second (contrariwise) is narrower in the beginning then at the lower ende, and exceedeth also more in largenes, then in thickness: but the third is a small bone, and is committed to the inferiour part of the second bone, after the like order as the second is ioyned with the first: and is knit there, to the second bone, whereas the Cartilages of the vii. ribbe be Articulate to the lower seate of the same. This bone, as it is large, so is it also slender, and in the lower seate therof degenerateth into a Cartilage, which hath to name by proper appellation from the Latins, *macronata Cartilago*. The substance of the bones of the breast retaineth no certaine soliditie, but are every where soft, spongie, and hollow, and are bounde together, eche one by the helpe of a Cartilage: the whiche manner of knittynge and Coarticulation, Galen calleth *Synarthrosis*, whose moving is obscure, and as playnly we have discused heretofore: but *Vesalius*, and *Collumbus* do write in steade therof *Symphysis*: which we declared to be destitute of all manner motion, as the breast bones, which (notwithstanding they be committed together with Cartilages,) haue not any moving, but thereby rather bow, and yeld to the elation and depression of the ribbes. The upper part of the first, is much larger then any part of the rest, and also thicker, hauing in the middlemost part therof above a hollow manifestly exculped, giuing place to the descension of the rougher Arteries. On eche side of the which corner, the substance of the same bone is once againe creased outwardly, and that most excellently, to admitte the Articulation and knittynge of the canell bone on eche side. Both the inner and outer region of the breast bone is indifferent smooth, and euen, but the toppe of necessity hath a certaine roughnes, whence springeth and exurgeth a valiant long Muscle, stretchynge from the toppe of this Pectorall bone, vnto the Mammillar Proesse on eche side, where it is woorthely implanted.

At the lower end therof (as we sayd euen now) groweth the Triangular Cartilage, named *Macronata*, because it is downewardes sharpe poynted, and edged like a sword: wherfore some also call it *Ensisformis*, and *Gladialis*: other, for that it hatheth like a shield, say *Chelyalis*: some againe, *Malum granati*: but the Grecians, *Xiphoides*. Whether by some heretofore, haue supposed the mouth of the Ventricle to be chiefly defended, as onely a muniment for that end to haue bene created: where as it is euiden, the mouth of the Ventricle to be thence not a litle distant: & nearer (by farre) situated vnto the backe. Wherefore this accordynge to the opinion of the latter sort, the breast bone was created as a stabilitment vnto the ribbes, which Orbicularly effourme, & fashion the amplitude & largenes of the breast. But *Macronata Cartilago* (sayth *Realdus*) is principally a propugnacle vnto *Septum transversum*, which in that place is much of finewe, or tendinous substance, where by it cometh to passe, that by the vicinitie it hath with *Septum transversum*, and the same *Diaphragma* with *Pericardon* (whiche is the Inuolucure of the hart,) and so consequently with the hart, a wound that penetrateth the same Cartilage, and hurteth the midrease, induceth death, most commonly: as more at large we haue

haue declared other where.

As touchynge the Officle, or litle bone contained within the hart, although it please any such matter, deriding the authoritie of Galen somuch in that behalfe: yet as tract of tyme (the naturall course experience,) teacheth the paynfull Arill (ready way out of the dozes of darknes: eue so truth (like vnto the flames of fire) being neuer so couered & damped for a space, findeth yssue (at length) on one side or other: & so is clearly apparant to all beholders. I meane not hereby to repugne altogether the doctrine of so woorthy a man, whose knowledge & rare experience (I ought) so I honour: but rather with such cōiecture as standeth both with experience, & sufficient probability to stand forth in the middest. Galen sayth in his vii. *De Vsu partium*, that in the foundation of the hart; (about the rootes of *Arteria aorta*: the Arteriall Veines, & of their Membrans,) is found a certaine Officle, which is not playnly a bone, but like a Cartilage: but the greater that the creature is, the more also doth that Cartilage degenerate into Offic substance. Whereby is signified, that Galen meant not in the hart onely of Man that a bone might be founde, who is nothing neare the quantitie of such creatures as he dissected for that purpose: & after the inuention therof, as at Rome he found it in an Elephāt) he forbiddeth vs to call it simply a bone, or an Offic Cartilage, but a Cartilaginous bone. And notwithstanding that he sought the same in other creatures then man, yet I cannot thinke that he simply ascribed the same vnto the body of Man onely of imagination: But as he sayd as touchynge beastes, the greater they be of bodies, the more also so I vnderstand his meanning as touchynge men, not so much as their bodies differ in quantitie, but rather thus, & elder that the body is (especially after the ripenes of yeares) the more manifestly also doth the same Cartilage become harder of substance: so that in men full of dayes, & such decrepittes as old age hath long arrested, we may finde (as Galen sayth) this Cartilaginous bone at the rootes and Membrans, of the sayd Arteries, and Arteriall Veyne: as it were a stasse, or stay vnto them and a stabilitment to the whole body of the hart in the debilitie of yeares, and that with great perspicuitie. Doth not *Collumbus* himselfe, in his vii. booke entreatynge of the hart and Arteries confesse, that in the place before mentioned doth grow a Cartilaginous substance? Whiche, by his wordes in his xii. chapter of bones, he graunteth to be a firmament and ground to the rootes of the same Arterie, and Arteriall Veyne? And who doubteth but as age taketh away Appendances, dzineth out Seames, hybeth Commillures, and in diuers places of the body transfozmeth Grissels vnto bones, & soft substance into harder: so likewise this in the hart, degenerateth from the nature of a simple Cartilage, into a Cartilaginous bone. And that I seeme not to runne altogether headlog vpon coniecture, I make it knowne vnto you that the sight of myne owne eyes haue testified, in dissectynge the body of an old Gentleman, of great woorthynesse, and famous antiquitie, in Lincolneshyre, Anno Do. 1574. Whylest imitatynge the mynde of Galen, I opened the least Ventricle of the hart, & searched to the roote of *Aorta*, I easily discovered the thing, wherfore I sought: findynge there the Cartilage fastened to the Membrans, of the sayd vessels, become bywardes, playnly of Offic substance, the length of iiij. Warley coynes, & at the neither end grisselly, the length of one: where to was fastened the rootes of the great Arterie, named *Aorta*, & the Arteriall Veyne, with their Membrans. And this Cartilaginous bone I willingly separated fro the body of the hart, in open sight of the woorthypfull, the old Gentleman his aliace & frendes, who I suppose haue as yet referred it. Thus (gentle Reader) thou hast to determine of the bone in the hart: not that I will haue it found, as generally as other bones, in every age, but that I would not neglect the description therof, for thy easier vnderstanding, where soeuer thou

I. J.

Thalt

Of the bone in the hart.

Opportunitye fin-  
eth that some-  
tyme which want  
of good occasion  
long tyme before  
did darke.

I purpose not to  
proue that which  
shall be found in  
all ages but that  
in the last age I  
suppose it reu-  
for the most part  
although I collum-  
bus consideeth no  
tyme.

The beginning of  
the bone in the  
hart.

Galen nameth the  
beasts where in he  
found this bone.  
It is not an Offic  
cartilage but acce-  
rtilaginous bone.

The other body,  
the harder this  
Cartilage.

The use of bone  
in the hart.

What age bring-  
geth to passe.

A crew employt in  
the bone of the hart.

Where the bone  
in the hart was  
found into what  
kind of one.

That the Carti-  
lage in many  
yeares both dege-  
nerate into a bone  
though some o-  
ther creatures  
haue it in all a-  
ges.



The shoulder blades or scaple bones.  
The number of scaple bones.  
Situation.

Use.

What part of the backe standeth most in the way of hurt.  
The spine of the scaple bone.

The scaple bones to the cancell bones and shoulders.  
The knitting of the cancell bones.  
The necessity of their construction.

The scaple bone three square.

Lib. 1. Cap. 12.  
The foundation of the scaple bone.

The processes of scaple bone.  
The first process.

What amplitudeth the hole in the first process.

The use of the cartilage in knitting of the shoulder to the scaple.

The 11. other processes, their use and situation.

The process Ankyroides.

The insertion of a Muscle to Ankyroides.

The process Acromion why it is so called.

The use of Acromion.

The cancell bone is joined to Acromion.

shall happen to inuent the like.

**N**ow it followeth to speake of the shoulder blades, which the Grækes call *ἀκρονάτιον*, and somelwhiles simple *πλάτ*, but the Latins most commonly *Scapula*, & are two in nūber: that is to say, on each side one, and are sited towarde the toppe and posterioir region of the brest, being bound also by the interuenture of Muscles, to *Occiput*, to the Vertebres of the necke, and brest, and to the bone *Hyoides*: so likewise cleauing to the vppermost ribbes behynd, do serue as proper propugnacles to defend the backe, and giue strong repulse to all outward iniuries offered therto: the whiche part in backe of the backe is moze in the way of outward damages, and strokes then any other: wherfore the shoulder blades are made after a defensue fourme, being inwardly towarde the ribbes, concaved, and hollow, but outwardly prominent, and puttynge forth a strong ridge, like the rising of a hill, or rocke vnto the superioir part: not a litle to the augmenting of their validitie.

And besides those partes before named, whoseth not how the shoulder blades are most firmly Articulated to the Cancell bones, and shoulders, to the Vertebres of the brest, necke, *Hyoides*, *Occiput*, ribbes, & their Muscles: wherby in backe appeareth how necessary is their construction, since not onely they defend the hinder partes, but also admitte the insertion, & due growynge and rising of Muscles.

Their fashio is after a Triangular maner, although not equally sided, or square. For the vpper part is a great deale shorter then the other two, which goynge downwarde, do end at an obtused and blunt corner. And this obtused corner, is that part which *Columbus* supposeth most woorthy to be called the seate or foundation of the shoulder blade: Albeit *Vesalius* iudgeth it to be that side of *Scapula*, that reacheth down after the longitude of the backe, next to the Spinall Processes of the pectorall Vertebres.

But briefly, these bones are endued with thre notable productions, or Processes: whereof the first being likewise shortest, hath a broad and hollowed head, ordained necessarily to receiue vnto it the toppe of the shoulder, being first knit therto: yet because the compasse of this Process was not sufficient inough to containe therein a hole agreeing, or correspondent to the greatnes of the head of the shoulder, and because also it was requisite, that the largenes thereof should be such, as might safely comprehend, and keepe the same for ouer lightly rushing out of his place: therfore nature not onely added therto a thicke Cartilage: which conueryng the inner part and sides of the cauities, maketh for it a large and deeper hole, but also beset it excellently with the two other Processes, as it were on the most perillous partes, and dangerous sides.

One of them compared to a Crookes booke, or anker, is therefore called *Ankyroides*, or *Coracoides*. By this the arme is distaunt, and deduced from the ribbes: & this containeth the shoulder bone in his seate, yelding thereto great validitie and force on that part. So lesse maketh it also the insertio of the Muscle, which draweth the shoulder blade to the Anterior partes, and botweth the cubite.

The other, being the last of the thre Processes, being that, we assimuled and likened to the ridge, or rising of a hill, is farre longer, and further prominent then any of the rest. This is it which the Grecians do nominate *ἀκρόμιον*, as it were the poynt and toppe of the shoulder. This Process (as it were honoryng ouer the toppe of the shoulder) woorthely prohibiteth, that no sobaine Luxation vpwordes be committed, but is euer a most safe defence and propugnacle thereto: so that the shoulder is strongly munited and fenced from sodayne decay, by the two last recited Processes, and no lesse bound vnto his seate by the first. But this, not all the office of the thyrde: for, besides that it maketh the shoulder eche where moze strong and perourable, it offreth forwardly a place, whereto the Cancell bone is aptly knit

knit and confirmed. And prepareth a most apt seate for the insertion of Muscles.

These bones are eche where vnequall, and no place fourmed lyke an other. For all that space on the vpper side, betwene the broad Process backwarde by the ridge, to the extreme border, and also beneth the same ridged Process, downe to the seate or foundation aforesayd, is very thynne, & vnequally hollowed, but the Processes them selues, & (principally) that part of the bone that is next vnto the arme, sheweth not onely an excellent thickness, but also the substance therof appeareth medullous and hollow. The inner region therof hath cauities, that obliquely stretch querthwart, made by the often mouynge of the ribbes, which on the outer side agayne do protuberate and giue forth. And notwithstanding that some partes outwardly, yeld to the inner cauities mentioned, yet neuerthelesse the same side, refuseth not to giue place with like hollownes, to the Muscles which are orderly in them couched: which marueilously argueth the industry of nature, who to the end their substance might not thoroughly be decayde, would not eche where, for the insertion of Muscles, or scope of the ribbes, embicill, and wast so much of the bones: but rather outwardes, and inwardes (as such occasion was offered) that they should bove, and yeld on each side.

The number of Appendances attributed to these bones are v. that is to say 11. at the inner side, neare to the goynge down of the Spine, which are fastened to the foundation of the shoulder blade: the which place is the original of certaine Muscles. The other 4. portions Appendances, do minister Ligamentes, wherewith the shoulder is bound in his seate or hole, and the Cancell bones fastened to the rehearsed Process named *Acromion*: that is to say, of these 11. Appendances *Acromion* chalengeeth one, and the hollow or seate of the shoulder the other.

Furthermoze in the toppe of the shoulder blade, betwene the Process *Acromion*, and the supreme part of *Scapula*, is a proper rounde cauitie made, that by the Muscle therein sited, might happen the circumaction and round, or wheelyng motion of the shoulder. Such profitable therfore we must accompt this Process *Acromion*: which both strengthneth the other partes, produceth Appendances, offreth it selfe to the insertion of Muscles; and stayeth in such order the Cancell bones, as that *Columbus* sayth, such creatures as haue not those bones, neither haue they this Process *Acromion*.

The Cancell bones therfore, called in Græke *κλάειδες*, in Latin *Furcula*, *Clavicula*, or *Ingula*, whiche we haue not yet spoken of among the partes of the brest, are certaine bones ioyned on eche side aswell to the brest bone, as the shoulder blade, and thus.

From the cauitie on both sides, of the toppe and vpper part of the brest bone, which we haue before described, departeth the Clauicles or Cancell bones (as our common English phraseth) & being onerthwartly conuayed, do ascēd aboue the top of the shoulder vnto the late recited Process called *Acromion*: where they shut in, and enclose the shoulder, coarticulate, & knit with *Scapula*, as we haue sayd before, in such order, as that the arme thence by no manner of meanes, may slippe vnto the brest: but there hence holdeth it so stedfastly distaunt, as greatly anapleth, not onely to the mouynge of the handes aptly to the brest, but also (as it cometh) most seruiceable to their innumerable actions: which other wise might moue, but at no tyme with such stabilitie, & stedfast certaintie of doynge: which is the cause that some haue called them *Furcula*: as it were little proppes, or postes, to susteine the shoulders: some agayne *Clavicula*: as it were the keyes of sure and certaine mouynge. Others *Ingula*: as they say, for the fashion of yokes by them resembleth.

To speake of their substance, which is fillulous, and hollow, couered with a thynne bonny crust, you shall finde them most easie to breake, being much moze roūd then a ribbe, and also thicker: saue that their hollownes maketh them moze

The inequality of scaple bones in thickness and thynnes.

Where the scaple bones are fungous and medullous. The inner cauities of the scaple bone. The cauities on the outside.

The industry of nature in the outer cauities.

Five appendances of the scaple bone.

The vices of the appendances.

The use of the cauitie betwene the process *Acromion* and the head of the scaple.

How little is the process *Acromion*. Such creatures as haue not cancell bones doe want the *Acromion* process. Clauicles, Clavicula, cancell bones. The cancell bones ioyn to the toppe of the brest.

The description of the cancell bones.

Their vices.

Why they are called *Furcula*.

Why they are called *Clavicula*.

Why they are called *Ingula*.

The substance of the clauicles. The figure of the clauicles.

ragil 1, and bytle: their making is not unlike this figure. S. for twise are the Clauicles crooked, twise bunched out, and twise concealed, or hollowed: from the beginning at *Os peloris*, unto the middle region, or halfe of the bone, it is hollow inwardly, but outwardly bowed in round compasse as long a space. And contrariwise, going from that same halfe part, by to the Procelle of the scaple bone, it is outwardly hollow, and inwardly conueyed: the which kynde of crookednes nature deuised not in vaine: esteeming it more fitte and necessary, that so the Clauicles might occupy their places, as rather *Aspera arteria*, and these needfull passages of the throte might not be hindered, or pessed, then that they should be directly stretched so, as might both obstinately resist those, and be neuer the fitter to Articulate with their places.

Agayne note, that for great reason the Cannell bone is rather forward, then backwardes prominent, and bearing out. For vnder that regio lyeth the progresse of principall vessels, caryeng the Animall, Vitall, and Naturall Faculties that is to saye *Vena axillaris*, and *Cephalica*, with an excellent great Arterie, beyng accompanied with the five Nerues, vnto the hand transmittet: to all which, the incurved or crooked part of the Clauicle notably giueth place, and is a mete propugnacle for their safe passage.

The head and vpper end of the Clauicle, where it meteth with *Acromion*, is broad, and depressed, hauing therein a cauitie exculped, mete to admitter the syde of the Procelle, for the softer beyng thereto. But the other head and end is round, after a certaine manner, especially in that place, whiche the hole exculped in *Sternon*, receiueth.

Appendances not withstanding are proper to both the heades, couered with their Cartilages: but to that end, that is setted in the best, an other moreouer is added: yet is their knittynge but after the maner of Articulation called *Arthro-dia*: Finally at y clauicles some Muscles haue their begynnyng, other some there ending: therfore it behoued some partes of them to be rough, ridged, or knotty: as may be sene in diuers places of the same bones, inwardly aspedyng, for the procueryng of Ligamentes, & Muscles: which may not escape vntouched, when we come to their descriptions. Lastly note, that as no part is destitute of nourishment, no not the Loynes, but haue that which is due to nourishe and maintayne them, so nature forgot not to giue vnto these, as also to the scaple bones last before rehearsed, some slender furdles, and twigges of Veynes, which inscryingng their substaunce here and there, do duely feed them.

**H**umerus, whiche in Englishe phrase is interpreted the Shoulder, is alway taken for the Procelle, and large ridge or rising of the scaple Bone, or Shoulder blade called *Acromion*: so that all that we lay vpon this Procelle of the scaple bone, we say we beare it on shoulder: but note gentle Reader that here according to the Latin description, thou mayest permit me to be an other phrase, and to vnderstand by name of Shoulder, the hyghest bone of the arme, which be-neath, with *Radius* and *Vlna*, and aboue with the short Procelle of the Scaple bone, is conioyned.

It is singularly numbred, and of all the bones of the arme, the greatest long, and roid, but not largest of all others except the thighe: though Galen willed vs so to esteeme of it: for the great bone of the legge excedeth it fare, and (as sayth *Columbus*) it is neither equall to *Os sacrum*, in magnitude, nor to *Os Ilium* in latitude. And notwithstanding that it is after a sort (for the most part) round, yet it is not of Cauties or corners, but is much vnequall, for the playng, knittynge, and rising of the Muscles: the superiour part therof is roid, and great headed, in dedwed with a large Appendance: which is also, not sparyngly couered with a Cartilaginous crust, aptly inserted in the hole or cuppe of the Scaple bone: which

which hole with an other Cartilage is notably enlarged, supplyng the want of thickness in the same Procelle: whereby the hole could be no larger, as we haue touched before. The same vpper head hath also two Processe, with a corner, or gutter most euidently deuised: the foremost of them is lesse then the hymost, and the greatest portion of them both, is within the compasse of the Appendance comprehended: and that cauitie or hollow, interiect betwene them, is a seat for the Muscle, which with a double begynnyng flowyng from the shoulder blade, is this way delated downward, to the bowyng of the cubitte. But the inferiour part of this shoulder bone, not beyng round as is before sayd of the superiour part, is (notwithstanding) large, and variformed, eche side vntylke another, both in corners, heades, prominent partes, and such like. Among the which, we haue to note on eche side a hole, that is to say, in the fore side and hymost part: although one of them in largenes, and depth, excedeth an other. As that in the inner seate forwardly, which receiueth the second Procelle of *Vlna*, whilist the cubit is contracted and drawne in such wise, as the hand may touch the shoulder. But the hole in the hinder part of this lower head, is much deeper and larger, wherunto, when the cubit is at furthest extended, the posteriour and great Procelle thercof, is roted and wheled: being a stoppe and stay thereto, then which, no further it may passe. Wherfore *Hippocrates* calleth these holes *Sulphida*, beyng the seates, and groundes, of the cubittes motion.

But besides, this inferiour part, which we haue affirmed to be large and ample, riseth as it were in ij. heades, not much in space vnequall, nor in greatnes differing, being excellently therfore (by the consent of all Anathomistes) compared to a pulley, wherein gutters are carued for the course of the ropes: so betwene these ij. heades or ridges, are two notable gutters or cauities, excellently deuised by the third ridge, beyng the least of the ij. In one of the which gutters runneth *Vlna*, lightly to the extendyng, and bowyng of the cubitte: the endes of whose motions, are accomplished most exquisitely, by the Cauties before described: in to which this gutter, due to *Vlna*, on eche side falleth the other gutter, situate in the space betwene the middlemost ridge, and the outmost head, yeldyng way to the inner side of the head of *Radius*, beyng deeply incrufted with a Cartilage, as also the head it selfe: which beyng more round then the other, is Articulated and knit vnto *Radius*, although the same *Radius* hath not a hole so large, as might comprize the whole scope therof: which (in my iudgement) had bene more inconuenient then needfull: for the outmost part of the inferiour head of the shoulder bone iusteth out more inwardly, and lesse outwardly, then any other: and the reason is, because the vpper head of *Radius*, lurketh more in the bosome of the inner region of *Vlna*: and that it should not comprehend such scope of compasse backwardes, the case is manifest, that in the extension of the cubit, when the head of *Radius* standeth vpon the toppe or hinder part of this hole or turne, then the posteriour great Procelle of *Vlna* is denyed to go any further within the hole, exculped in the hinder part of this bone. And how the highest ridge of the ij. serueth notably, to hold in the exterior side of *Vlna* in his motion, no man is ignorant. But this is to be noted of euery one, that the proper Articulation of *Radius* with the shoulder bone, offreth vnto vs the possibilitie of guiding our hand obliquely to the sides: and when it is extended together with the arme, such a motion is brought to passe by the benefite of *Vlna*, *Radius* consentyng onely.

Furthermore, beside these heades before mentioned, there are ij. Processe extat at the sides of y lower head of *Humerus*, of which the inner is much the greater: to these productions are fastened the begynnynge of Muscles exted to the extreme part of the hand. And although neither Galen nor *Vesalius*, with others in tymes past, haue knowen, or acknowledged any Appendance to this head,

X. iij.

where.

The cartilage en-  
creasing the ca-  
uitie of the hole  
bene aduantage  
hath to the motion  
of the shoulder.  
The Processe of  
the appendance  
of the shoulder.  
The vte of the ca-  
uitie betwene the  
Processe.  
The interiection  
head of y shoulder  
bone.

The deepe caui-  
tie one eche syde  
of the ridge, head  
of the shoulder.  
The vte of the ca-  
uitie on the in-  
terior.  
The vte of the ca-  
uitie on y outlie.

The three heades  
in the inferiour  
part.

Comparisō made  
to a pulley.  
The third head  
and middlemost  
is the least of the  
three.

How *Vlna* is in-  
serted to y flexion  
and extension of  
the cubit.

The gutter where  
in *Vlna* runneth,  
falleth from one  
of the deepe caui-  
ties, into y other,  
a head of *Rad-*  
*ius* inter to the  
outmost gutter.

Why y outmost  
head of the shoul-  
der beareth lesse  
then the other ij.  
Why the outmost  
head of y ij. bea-  
reth no compasse  
backward.

The vte of the  
highest head of  
the three.

The benefite of  
the infection of  
*Radius* to y shoul-  
der.

What motion is  
attained by *Vlna*.

The ij. Processe  
of the inferiour  
head of the shoul-  
der & their vte.

The inferiour  
head of the shoul-  
der hath an appen-  
dance.

Why the Canell  
bones are croo-  
ked.

Why the Canell  
bones are for-  
ward more pro-  
minent then back-  
ward.

The Clauicle de-  
fendeth Axillaris  
Vena and Arteria  
Cephalica, and v.  
Nerues.

The heades of y  
canell bone.

The head to *Acro-*  
*mion*.  
The head to *Ster-*  
*non*.

The Appendan-  
ces of y clauicles.  
Two manner of  
Cartilages to the  
lower head of the  
canell bone.  
The articulation  
of the clauicles,  
referred to *Arthro-*  
*dia*.

The Aspects  
and rough lines  
of y canell bones  
to what vte.

All bones are  
nourished with  
blood.

Humerus y shoul-  
der.

A note to the rea-  
der what is ment  
by the shoulder  
lead he be decei-  
ued.

The Situation of  
Humerus.

The cubitte con-  
sisteth of *Vlna* and  
*Radius*.

The description  
of the shoulder.  
Galen in error.

The inequalitye  
of the shoulder.

The appendance  
of the shoulder.

wherto the cubit is Articulated, yet *Realdus Columbus* (whose sweatyng labours could neuer appale the insatiable courage of this searching skill) hath professed it euident in young *Childre*, neither can I esteeme thereof any otherwise, in betwixing the exterior Procelle for the insertion of Muscles, being the lesser of the two last described.

As touchyng the space betwene  $\bar{y}$  superiour & inferiour head of this bone after the longitude thereof, you shall finde it somewhere Gibbous, or bunched, and otherwhere hollow, & flatte, the which varietie of forme, is required by the sondry uses of Muscles thereto on eche side adherent, as hereafter shalbe sayd: And since it is manifest to every one, that this bone of the shoulder is inwardly concaued, as also all others like in the body, for the contayning of such due nourishment, as Nature by the small braunches of Veines conueyeth into their substance, it shall not auayle me to speake more thereof.

**B**y the name of cubit we vnderstand the whole scope of length, betwene the shoulder bone, and the wrist of the hand contayning two long Bones, much lesse then the shoulder bone. Either of them are endued with their Appendances sayth *Columbus* but in the superiour part, where they be Articulated with the shoulder bone, the Appendances are but short, and transimitted into the portions of bones. Yet neither *Vesalius*, nor Galen had knowledge of them but in the inferior part, both the bones haue Appendances euident inough.

Of these two Bones, that which is lowest situated is called *Ulna*, commonly *Cubitus*, though (after the barbarous packe) *Focile minus*: but the vppermost *Radius*, and by the barbarous terme, *Focile maior*: they are ioyned together both among them selues, as well as with the shoulder bone, and wrist of the hand: although in the inferior part, *Ulna* be committed to *Radius* onely: but in order, as we will declare anon.

The superiour part (notwithstanding) of *Ulna* being thicker, both end in two Processe, long, and triangular, yet not sharpe as Galen accompted them, but obtused and blunt: these Processe are so attolled, and prominent, as behoued them to follow the space, that is excaued in the midst betwene them after the fashion of a halfe circle: the which cavitie, being shut in by these protuberatying Processe, representeth the figure of a C in Latin, not farre unlike  $\epsilon$  in Greeke and soz that cause Galen named it *Sigmoides*. It was ordained, that aptly the same Processe might complect, and embrace the hollow or rounded gutter in the lower end and shoulder bone, as aforesayd, and to be turned about the same: Wherefore in the midst of *Sigmoides*, we haue to discern clearly, a prominent line, which in the midst of the aforesayd gutter of the shoulder bone, runneth rounde, like a corde in the wheele of a pullic: whereby *Ulna* slippeth forth on no side, but on either side of the bones springeth mutuall ingresse: therfore this articulation may be attributed rightly to *Ginglimon*: to the first Processe, which is much lesse then the hymnost, and in the inner part thereof, where a cavitie is engraued for the purpose, the head of *Radius* is admitted sideway, and as it were leanyng to. But departing from these Processe, *Ulna* is the further downward, the more imbecilled, and weakened, euen downe to the very end or head thereof: which sometime enclineth more towards the inner part, where in a slight cavitie, made in the side of *Radius*, it slepeth. Neither is it ioyned with the wrist of the hand, as Galen supposed: for no portion of the wrist is found adherent to the lower head of *Ulna*. Furthermore, when as outwardly from this head of *Ulna*, a certaine litle Processe long, and sharpe, is produced, whiche the Grecian Anatomistes haue likewise nominated *Styloides*, Galen therfore iudged the same to be fastened to  $\bar{y}$  outer one of  $\bar{y}$  wrist, and so, by that reason, to become a meane to moue the had obliquely, or slopewise: the which opiniō *Vesalius* worthely reproveth, and wholly con-

ly confuteth with most probable reasons. *Columbus* (agayne) sayth it is so farre alienate from the nature of the thyng, and dissonant from veritie it selfe, as that the same Processe, to the workyng of the like effect in motion, as Galen would haue it, is rather a let and hindraunce, then any wayes a meane to further it. Neither is this Processe much distant fro the fourth bone of the wrist, although Galen commendeth thereto the big bone, which beareth veritie onely in an Ape. Notwithstanding, a certaine thicke & soft Cartilage is put betwene them, which supplyng the vacant rowne, where it is put, holdeth metly either of them, but therfore they are not coioyned. Neuerthelesse it may not be denyed, but that this Processe: addeth some strength vnto the wrist, lest it should altogether slippe fro that part: being therfore, so farre extended from the head of *Ulna*. To say briefly therfore, *Ulna* is in the exterior part thereof, euen, and round for the most part: but on the side towards *Radius*, is a certaine rough line, extendyng after the longitude thereof, with other light cavitie: out of which places, spring the Muscles seruyng  $\bar{y}$  to thode, as also that Muscle, that carrieth the fore finger fro the thabe.

The other and vppermost bone, called of the Grecians *ῥαδις*, of the Latins *Radius*, occupieth (outwardly) the whole length almost of *Ulna*, ending at it, thicke heades, that is to say, both vpward, and downward: but as the highest is more round, so the lowest is much greater, and broader: which, considering how it is aboue articulate with the shoulder bone, and beneath with the wrist, you will graut was not rashly denied. For the shoulder on that side endyng round, after a certaine manner, it behoued the head of *Radius* also to be more depressed, & somewhat sinuous, to the end it might yeld meanes to the mouyng of the hand, obliquely vpwardes, or downwardes: which could not be, but by the round cavitie in the head of *Radius*, cleauyng likewise to the rounde head of the shoulder: by whose benefit, it is circumuerted, and turned round: to the which effect, the corner, which we haue sayd to be insculped in the inner region of the first Processe of *Ulna*, aptly obeyeth, the interne position of *Radius* head, therein sitting: by the which double articulatio (also) of *Radius*, cometh to passe, that it easely helpeth  $\bar{y}$  flexion & extension of  $\bar{y}$  cubit. The same head of *Radius* is copiously couered with a Cartilage, to encrease the agilitie of his motion. But fro this head, descending with a necke, somewhat long, and round, at the outward side towards *Ulna*, thrusteth out a tubercle, whereat is ended the first Muscle, that to the boluyng of the arme, giueth occasion: and also receiveth a portion of an other, endued with the same function and office, which almost wholly, is implated to the superiour part of *Ulna*. But the inferior part of *Radius* being (as we sayd) more depressed, and broader then the other, & not a litle augmented by the helpe of an Appendance, is not onely at the end flatted, but also ample, large, and with a double hosome, or hollow excaued: wherein, the two vppermost bones of the wrist, are inarticulated and knit: to which, since all the bones of the wrist els, are with a streit bond vniued, and tyed, we may worthely with *Columbus* say that the whole wrist by the meanes of such coupling and tyng together, is destined to the articulation of *Radius*: whence it cometh, that it is not onely lawfull for the hand, to turne both vpward and downward, but also to be lead with libertie to eche side. Neuerthelesse, wher we will our hand to be bowed either obliquely vpwardes, or downwardes, that action is most worthely atchieued when *Radius* onely labourerth, *Ulna* resteth. But eue as *Radius*, to helpe & assist the flexion of the cubit, is aboue admitted into the of bosome *Ulna*: so it likewise (requyng to  $\bar{y}$  like mutuall societie, and deligence of *Ulna* in leadyng, and guiding the hand, whilest it followeth the motion of the cubit) for the seate of the inferior head thereof *Ulna* mutually ordaineth a corner: as before we haue touched. Wherefore *Radius* is aboue receiued of *Ulna*, but beneath receiveth *Ulna*: and this kynde of composition, is

Thy.

thought

The Processe Sigmoides, with not quite the same oblique meaning.

Sigmoides is next to  $\bar{y}$  up, bone of the wrist nor to the  $\bar{y}$ . By what meane this Processe is vniued to  $\bar{y}$  wrist. The benefit of Sigmoides.

The use of the cavitie and cavitie in *Ulna*.

Cervic. 2. Radius. The fixation of Radius. The head of Radius, compared together. The cubit bone is bound to the shoulder but beareth to the wrist. Radius, moveth  $\bar{y}$  hand obliquely vpward or downward.

The use of the cavitie in the inner region of the first Processe of *Ulna*. The use of much Cartilage about  $\bar{y}$  head of *Radius*. The necke of *Radius*.

The use of his tubercle, which were the necke. The description of the inferior part of *Radius*. The cavitie and: mityng the vppermost bones of the wrist.

The wrist of the hand is tyed to *Radius*. How the hand is mityed both vpward and downward. How the hand moveth by and down obliquely. How *Radius* assisteth  $\bar{y}$  flexion and extension of the cubit.

The principall meaning of the cubit is fro *Ulna*. *Radius* is aboue receiued, beneath receiveth.

The unequalle forme of  $\bar{y}$  space betwene the 2 heades of  $\bar{y}$  shoulder, and to what end.

The inward hollowing of the shoulder contayneth his nourishment.

The cubite what it signifieth. Of what partes the cubite doth consist.

Lib. 1. Cap. 24. The cubite hath appendances in the upper part. The interne part of Cubitus and Radius doe both their appendances long.

*Ulna* is also called Cubitus. Radius.

*Ulna* & *Radius* are committed together among themselves as also to others.

The use of Sigmoides. Lib. 2. of Cap. 17.

Vesalius Columbus. Ca. 24. The use of  $\bar{y}$  line in the midst of Sigmoides.

The articulation of the shoulder with the cubit is referred to Ginglimon.

How *Radius* to *Ulna* in the upper part is ioyned. How *Ulna* in the lower part is fetted to *Radius*.

Lib. 2. of Cap. 17. Lib. 1. Cap. 18.

Galen in error. The Processe of *Ulna* called Sigmoides.

The inferiour head of Radius why it is playne and forward becoming.  
Why there be many caviities in the posterior part of the interior head of Radius.  
The use of the Mammillar Proccesse in Radius.  
The outsyde of Radius.  
The line in Radius compared to the line in cubitus.  
The use of the line in Cubitus and Radius.  
The use of the Membran between cubitus and Radius.  
Why the bones of the wrist are hollow.

Note.

How the hand is denoted by Anatomical description.  
Brachiale.  
Postbrachiale.  
Digit.

Hipocrates.  
Columbus.

Seven & twenty bones contained between the cubitus and fingers endes.  
The volumes of Hipocrates not all alike.

What is the wrist of the hand.

The wrist consisteth of viij. bones.  
The bones of the wrist are all unlike one another.  
The first row of bones of the wrist.  
The second row of the bones of the wrist.  
How the bones of the wrist seem to grow together.

thought most aptly to be called *Arthrodia*: the Anterior part beneath of the head of *Radius*, is made playne, and euen, though somewhat bending, that so it might giue free scope and passage to the tendons of Muscles, which challenge the bowling of the second, and third ioynt of the fingers. After the same manner, the posterior part giueth volume to the tendons of Muscles, stretched to the exterior ioyntes, whereby they are extended, and holden forth: therfore vnequally is that part replet with caviities. The exterior portion of the same head, towards the thombe, putteth forth a certaine Mammillar Proccesse, for no other cause, but to defend the wrist, so that in that place it may not lightly be lured, or displaced. Moreover the outer syde of *Radius* is rounde, and leuigated: but within, hath (as it were) a sharpe edge, extended in lōg progresse, & distaunt from the region of the other line, described in the inner part of *Ulna*, very like vnto this. From either of the which lines floweth a certayn Membrane, to ech of them mutually fastned: whereby these ij. bones, so seuered one from an other, are colligated, and together in the middest after a certaine maner tyed. And this Membran maketh also a diuision, whereby the interior Muscles, of the cubit, are frō the exterior safely separated.

Both these bones are hollow within, and replenished with marcy: both that they might be the lighter, and also not frustrate of their necessary nourishment. **B**efore we fall to orderly descriptiō of the wrist of the hād, this one thyng we note by the way: that by the custōmable maner, and frequented phrase of our English speech, this word hand, compizeth all the space betwene the inferior head of *Radius*, and the extremities of the fingers: which, by the order of Anatomical description, is compounded of iij. partes: that is to say, *Brachiale*, which we call the wrist of the hand: *Postbrachiale*, which is the space betwene the wrist, and the first ioynt of the fingers: the third part then is *Digit*, or the fingers: whereto hereafter we will come in order. And it seemeth also, that *Hipocrates* vnderstode the like that we do by the name of *Mannus*: although *Columbus* writeth in his chapter of the shoulder, that *Hipocrates*, called the whole length from the scaple bone, vnto the extreme endes of the fingers, *Mannus*: whilst it is otherwise euident in his booke *De officina natura*, *M. Fabius Caluus* being interpreter: four: where he hath these wordes: *Mannus quidem ossa septem & viginti sunt.* &c. the which number, may stretch no further then from the first of the fingers, to the last of the wrist. But that the volumes of *Hipocrates* are not altogether consonant, and agreeing together, appeareth not onely by this, but is witnessed in the same translation of *Hipocrates* wordes, wherof *Fabius Caluus*, *Gulielmus Copus*, *Nicol. Leonicens*, and *Andreas Brent.* were interpreters.

**A** length returning to the first of the three diuisions of the hand, which is called of the *Greekes* *χραιορ*, the *Latins* haue in steade thereof (as is sayd before) *Brachiale*: it is to be vnderstanded the whole strewe, and packe of bones, interstid betwene the cubit, & *Postbrachiale*: which is the middle of the hand, (whereto I can giue no proper Englishe, except I shall call that part the backe of the hand, or after the *Latins* the *Postbrachiall* bones.

The number of the bones that constitute the wrist of the hād are viij. distinct, & ioynd in double order: that is to say ij. rowes, containing in ech iij. bones, all diuersly fourmed, not one like an other either in magnitude fourme, or situation.

The first row of these bones are vpwrdly, so committed to the head of *Radius*, as that the first, and second thereof, are fastened within the bosome of it, the third seemeth a litle to enter, but the fourth seemeth to be ioynd to no other bone but the third: whereto it is stiffly annexed. The second course or row, is articulate in their posterior part, to the *Postbrachiall* bones, but in the fore part, with the other bones of the wrist: which among them selues, are so connected and knit together with Cartilaginous Ligamentes, as that they seeme to grow together.

As

As I sayd before, they are so straunge, and diuersly fashioned, that a man can not rightly inuent, whereto to compare them: yet notwithstanding, and although they are not endewd with proper names, they are sufficient easie to be discerned, iudged, and knowne, by their number, and order: which is after this sort.

The first bone of the wrist is that, which appeareth vnto vs in the inner side of the first ranke, towards the thombe.

The second succeedeth the first.

The third, is with the second coherent, at the outer side towards the litle finger, or cubit.

The fourth and least of all is knit vnto the third.

The fifth is the first of the second ranke, and next vnto the thombe.

And so thence the vi. viij. do follow in order.

And thus, as you see in number, and figure, they are different, so also in greatness, and litleness. For the greatest of all are the first, and viij. of which ij. it is hard to iudge the greatest: the second is lesse the these but bigger then all the remanēt: then challengeth the viij. and after him the fifth, the first next, so then the third: the fourth of all others (as we sayd before) is least.

Now as touching their vnion, & order of composition: which ought aswell to be knownen, and considered, as all that we haue hetherto, spoken of them.

The first bone therfore (besides that it is articulate with *Radius*,) in the superior part thereof, where it protuberateth round, cleaueth to the second, entyring the cavitie therof, and admitteth into it the round head of the seventh: as also in the inferior part, is coherent with the v. and vi.

The second, not onely vpwrd, entreteth the hollow of *Radius* together with the first, but in the inferior part, where it is hollow, is connected with the vi.

So likewise the third is ioynd with the second, and in the lower side toucheth the viij. and in the hinder part inwardly, towards *Ulna*, meeteth the fourth.

The which fourth we finde committed to none other.

The fifth next, in the vpper part with the first, in the hinder part with the vi. & is adherent to the prominent Proccesse of the second bone of *Postbrachiale*, (if by the way, we constitute, as *Columbus* would, v. bones thereto, wherof more hereafter) the inferior part thereof the first bone of *Postbrachiale*, which *Galen* maketh the first ioynt of the thombe, receiueth.

The vi. is knit to the first, fifth, & seventh, on that side where it respecteth them: but with the inferior head, or swelling, it is fastened to the angular bosome of the *Postbrachiall* bones, from thence respecting the third also of *Postbrachiale*, whose first, and longer produced portion it sustenteth.

The seventh endeth at the first, second, first, and viij. but not equally, or in like order committed to one, as to an other: since it hath some sides hollow, others boled, or gibbous. Notwithstanding in the inferior part, it is rooted to a portion of the third, and fourth bones of *Postbrachiale*.

Lastly the viij. which is highest, on the other sides is coupled with the second, third, and viij. and in the inferior part, it is a seate vnto the fourth, and fifth bones of *Postbrachiale*: to which also it is coarticulated, and knit.

Thus to speake briefly of these bones of the wrist, although there cometh no peculiar Muscle vnto them, as the author of action, whereby we iudge it obscure: yet are they not vnmouable, or wanting motion in deede, but yeld to the styring of the hand, both vpwrd, downward, and to the sides.

Moreover in the interior part of the wrist, we finde a broad, and deepe cavitie, or bosome, though the which are concurrent, not a small number of tendons of Muscles, to be inserted to the ioyntes of the fingers. And in this balve, or hollow,

Bones of the wrist.

1.

2.

3.

4.

5.

6. 7. 8.

The vnion of the brachiall bones.

1.

2.

3.

4.

5.

Galen.

6.

7.

8.

The bones of the wrist haue oblique mounting.

The wrist moueth the hand downwards, and to the sides.

The description and vse of the whole wrist.  
The balve on the inside of the wrist.

R. i.

low,



The use of the Ligament from the Proccesse of the viij. bone.  
The use of the Proccesse of the viij. bone.

How the bawle in the wrist of p hand is made.

The outside of p wrist how it is, and why such.

The use of the lower Ligament, one the outside of the wrist.

A he bones of the wrist are not and The fourth bone is almost altogether solid.

The fourth bone for his proportion is no more solid then the rest.

The fourth Osicle hath no cante as Galen saith.

Cap. 25.  
In Apes Galens affection is described.

The ignorance of Corn. Cell in the bones of p wrist. Lib. 1. Cap. 3.

How these bones are conioyned among the selues and with others.

What is Postbrachiale. Cap. 26. Vespas. lib. 2.

The Postbrachial bones. Cap. 26.

The first bone of the thombe a bone of the middle of the hand. The first ioint of the thombe, how iointed to the fist bone.

low, they saine as it were included, or locked by, for overflowing their seates with a strong Ligament, produced from the Proccesse of the viij. bone, and inserted ouerthwartly to p side of the fist. For which purpose, that their being might be more safe, and their scope more free, nature caused the same Proccesse of the viij. bone, to hang, and houer inwardly lyke a sieled valvle: so that the space, or distance, betwene the head or extremitie of the same Proccesse, and the fist Osicle (which with the side somewhat also leaneth towarde it) is nothing so much, as we discern in the compasse of the hollow under.

But the exterior part of the wrist, is the way for the tendons on the outside running to the fingers: yet notwithstanding, it hath no notable cavitie, but rather is boled, or rounded outward: for as much as those tendons are much lesse then they of inner side, and therefore (also) occupy lesse space. So accordingly therefore it was decent, that the extreme region of the wrist of the hand, should carie a circular kynde of fourme, and the interne, playne. Yet albeit the inner side by the aforesayd valvle, or valvle, seemeth to make a most apt way, and safe conduction for the tendons, produced in that region: so must we consider, that they of the extremitie region of the wrist, are not rashly left, or inordinately given over to liberty: for so in bayne had grown forth the four Ligamentes on that side, which clothe, and so surely bynd them in. Galen in his viij. chapter of bones, affirmeth these Osicles of the wrist of the hand to be hard, and solid, but not any thing medullous: as *Columbus* (not rashly) since his tyme hath assured us: though amongst all the rest, he sayth, the most hard, and almost altogether solid bone, is that, which in the fourth place we have here before numbred.

But if any industrious Artiste, shall at any tyme fortune to finde the contrary, I for my tyme am fozt to confesse, me neuer to have inuested, or proued the like Soliditie in the fourth, and little Osicle: neither any more considering the quantitie therof, then in the rest, albeit it may saine very likely to some, by the littleness therof. That it should also have a certain Celle or corner, answerable to the Proccesse *Styloides*, produced from the inferior head of *Vlna*, let no man beleue, although Galen him selfe haue written it. For neither hath the same Osicle any such cavitie, neither doth the same Proccesse in the wrist of a man, reach, or extend so farre: as unto it, wherefore in Apes *Columbus* verifieth this his Assertion, in me the truth standeth otherwise. *Vesalius* noteth the composition of these bones, to be so excellently compact, and wrought together with Ligamentes, as, unless they be diligently cut, and fret away, together with the Membrans, we might suppose them to be all one bone, and altogether vncertain to iudge how many, as *Cornelius Celsus* in his viij. booke, and first chapter, confesseth himselfe inicient, by accompting their number vncertaine. Their mutuall coniunctio (sayth *Fernelius*) is *Synarthrosis*: their iointing with *Radius* (sayth *Columbus*, confessing likewise the other) by *Diarthrosis*: and with the bones of *Postbrachiale*, partly by *Synarthrosis*, and partly by *Diarthrosis*.

This *Postbrachiale* (as partly we haue touched before, called of the Grecians *μετακάρπιον*) is that part of the hand, which inward we call the palme, but outward the backe of the hand. Whereto accordingly, *Euchsius* saith, some of Galens interpreters haue called it *Palma*, others *Manus Pectus*, and so forth. *Vesalius* sayth, and before him Galen, that this part of the hand, namely *Postbrachiale*, is constituted of viij. bones: in the which number is left out the first of the Thombe, which *Columbus* would (most properly in my opinion) haue added: & that not without good stay of reason: since it as nearely succeedeth the bones of the wrist, as the other: being also after the same rate committed to them, saving that the Articulation therof, is more slacke then in the rest: whereby (also) it purchaseth a more euident motion. It is fastened unto the fist bone of the wrist, by

Arthro-

*Arthrodia* under *Diarthrosis* although (by reason of those bones which be small) such manner of Articulation may be referred unto *Enarthrosis*. For the fist bone of the wrist hath a cavitie sufficient playne, as a corner excavated, whereunto, the head of the ioint, after a certaine manner long, and forward protended, or stretched, is innited.

The second *Postbrachial* bone, which Galen numbzeth the first, endeth at a deepe cavitie in the superiour part, where it receiveth the protuberant, or boled head of the viij. *Brachial* bone, and iointeth his side to the side of the fist: whereto, in that manner it seemeth to claue.

The third hath also a hollow end, & in the inner part, towarde the thombe, stretcheth forth as it were a Proccesse, whose face, or outer border is settled to the viij. bone of the wrist. The remnant of his sinewes, or hollowed head, admitteth the viij. Bone.

The head of the fourth is foure squared, being iointed with ij. bones: that is, part to the seuenth, and part to the viij. those partes being also flat, answerable to their squarenes: but somewhat inward declined with all.

The last hath likewise a foure squared head, but somewhat toward the outer partes tending, and cleaving also to the extreme portion of the viij. and last bone of the wrist.

After this sort are the *Postbrachial* bones committed to them of the wrist: where as also you haue to note, that as their endes are squared, and flatted of sufficient compasse, towarde those bones, whereto they are set, and iointed: so their sides also, do mutually yeld one towarde an other: as the last to the fourth: the fourth to the fist and third: the third to the fourth and second: and the second to the third on that side and to the side of the fist bone of the wrist outward: onely except the first, which supporteth the thombe, and hath more ample scope, and distance from the rest, then the other haue among them selues. But agayne, beneath in the lower endes of the *Postbrachial* bones, where they be together with the iointes of the fingers Articulated, all end with one manner of head: which being round, do enter the holes, or hollowes in the endes of those iointes, lightly excavated, & that (as was requisite) with a slacke, or romth kynde of knitteng.

To describe them after their longitude: the other viij. *Postbrachial* bones beside the first of the thombe, from their first heades, going forward, towarde the fingers, become smaller, and slenderer, vntill their middle part or region where (being smallest of all, and their substance most lightened) they begyn agayne, from thence afterwarde, to augment, and engrosse their substance: so that, to speake clearely, as they first decreased to the middlest, and waxed weaker, so now also from the middlest downwardes they encrease, more, and more, in thickness and strength, and that more apparatly in those ij. which admitte the middle, and the ring finger: the other ij. for the forth most, and little finger, haue in meane sorte the like delineation.

In the inner side of these bones, all after their length, runneth an angulare, or cornered line in the middlest of them: made for the cause of the Muscles to them adiacent, as also doth the attenuation of them, towarde the middlest as aforesayd. For so the Muscles haue commodious scope, and room to cleave vnto, and betwene them: or els the palme and hollow of the hand, should haue bene more hugely heaped, and stozed with them, then had bene conuiuent for the prompt translation, and handling, that now appertaineth to the hand.

Besides, the *Postbrachial* bones are above, and beneath, defended with Appendances: from whence Ligamentes customably are produced: by whose benefite (also) these bones among them selues, are together connected, and bound. For they are they inwardly distitute of their proper hollownes, to maintayne their

As in

Sub

Their Composition.

How the *Postbrachial* bones are beneath iointed to the fist iointes of the fingers.

*Postbrachial* bones their longitude, & thombe excepted.

The use of the angulare line.

Why these bones are attenuated in the middlest.

The appendices of the *Postbrachial* bones and their use.



substance, with dew medullous nourishment.

It resteth now to speake of the fingers: which once discoursed in that order we haue begun, we shall leaue the hand, with the partes therof, sufficient playnly, and also narrowly touched, as farre as the description of Bones may extend: for thoroughly to explicate the manner of their motion, it beloneth not here to expect, but onely in the Discourse of Muscles: where their proper actions to decipher, we haue wholly determined.

Bones of the fingers, 15.

**N**ow the Bones that constitute the fingers are in number 15. that is to say, 15. in every one. In the which accompt (lest I should seeme to repugne the sentence of most famous writers, and Anathomies of rare experience) the first bone of the thombe is comprehended: which *Columbus* would haue numbred among the bones of *Postbrachiale*, as before is touched. Peruerthelesse if reason in your selues, shall cause you consent also to *Realdus* his iudgement, and to attribute the first of the thombe to the number of the *Postbrachiall* bones: the there remaineth but 14. the thombe, and consequently 14. to the number of the fingers: for the *Sesamine* Offices, which hereafter we will declare, are neuer numbred amongst them: but how soeuer they are numbred, it beloneth vs now to appropinquate, and touch the effect: and of their quantitie, forme, and combination to say as it is.

From the number of the bones of fingers are but 14.

*Columbus* Cap. 27  
The substance of fingers of what sort and why.  
The bones of the fingers are not solid.  
The difference of the bones of the fingers.

The substance therefore of the bones constituting the fingers, is hard, to y end, that without daunger, they might promptly be applyed to the innumerable functions, whereto they are created: yet, notwithstanding their hardnes, they are with in replenished with the like nourishment dew vnto Bones: as lately we described in the *Postbrachiall*, therefore are not solid, howsoeuer *Galen* iudged them. Whether are they all of like quantitie, in length, or in thickness. But some longer, others shorter, some thicker, others more slender: that is to say, y thicker or longer fingers, merite also the thicker and longer bones. In like sort, the first ioyntes, are greater then the second, the second, greater then the thyrd, and so the thyrd, beyng last, are also least in all the fingers.

The fourme of bones of the fingers.

Furthermore a double, or y. fold fourme remaineth to these bones: in one of which, all the ioyntes agree: but the other, much unlike the first, the last ioyntes obtayne common to them selues: for their bones are more depressed then the rest, and beyng in the begynnyng somewhat broad, the further forth they stretch, the more also are they attenuated, and stretched, until they haue prepared as it were a necke: whereto is annexed, and supposed a little head, whereat they end. The same head is round and long: but the first ioynt of the thombe, and also the first, and second of the other fingers, haue both their begynnyng, and end more grosse, and thicker: that is, both their extremities are consistent in heades: whereof, the vppermost, is greater then the neithermost: and all the whole space, from the vppermost head, to the nether, is made more slender, and slender.

The bones of the fingers, ende at a head.

The figure of the first and second bones of the fingers.

Furthermore these bones outwardly, are made (as it were) crookynge, or bending inwards: but on the inside flat, and rather sinuous, or hollow: because there ought to runne no small, but round tendons, which with their magnitude, and rotunditie, fulfill the flatnesse so on that side, that the fourme of the fingers (neuerthelesse) is left round: whereas otherwise, to great a heaped ridge should haue bene couched on that side, to no lesse hinderance, and hurtyng of the action of handling, and apprehending, then snapt, and incommodious, for the quiet situation of those tendons: which, the bones beyng round, could haue had no certaine seate: but in the extension, and stryking of the fingers, to slippe on this side. On the outside of the fingers it is otherwise: for their subtile tendons are produced after the manner of Membrans: so, that that part be round, they hinder not, for the more elegancie of the fingers fourme.

Why the fingers are somewhat hollowe one y inside.

How y tendons one the outside of the fingers are created.

Like

Likewise in the inner region of the fingers on eche side, are certaine lines created after their longitude: whence the Ligamētes, which complex and hold those tendons in their places firmly, haue their originall.

To speake of their manner of knittynge, and composition, some receiue onely: other again both receiue, and are receiued: (although *Galen* saith, the head of the first bone, encrenteth the cauitie of the other following) for the first bones of the fingers are ioynted above, with the *Postbrachiall* bones per *Enarthrosin*: because their heades beyng situated, and incrufted with a Cartilage, do admit into them the round head of the *Postbrachiall* bones: which is *Enarthrosis* Articulation: beyng in this place right requisite that fingers might haue free scope to all sides, and turnes: though *Vesalius* denyed them their circular motion, or round turnyng, as *Columbus* noteth.

In the inferior part of these bones, are prominent two heades, betwene which, one angular, or cornered cauitie is engrauen, into the which entred the middle portion of the head of the bone following, beyng, for the purpose, lightly protuberant, or fuelled forth: and those heades agayne, are likewise inserted to the cauities, exculp'd on either side in the other. Wherby it is manifest, that these ioyntes both receiue, and also are receiued: the which manner of Articulation is called *Ginglymosis*, and that is to be obserued in the other ioyntes also. But betwene them all are interiected Cartilages, to make their knittynge easie, neither not their actions prompt: Appendances are not wantyng, which at eche end, are wont to garb them: except the extreme endes of the last bones, which needing no articulatio, neither are Appendances to the acceptable: for there the fingers are notably munited with nayles: which here we omit to speake of, but are not forgotten among the Cartilages.

Why their ioyntes are interlaid with Cartilages.

What Bones haue the appendances, which not, and why.

Of the exquisite structure of the hand.

The actio therof.

It is an Organ v. fore all organs.

Fingers why composed of bones, and ioyntes.

Generall differences of Apprehensioe v.

Why the hand be divided into fingers.

Why Nature made v. fingers.

Why one finger was made longer then another. Why n. comprehensioe is made the fingers are all of one length.

**T**hus if we wel perpend the construction, and composition of the partes, and bones of the hand, our senses shall soone conceiue the manner of the action, with no lesse admiration, in beholding the handy worke of the incomprehensible Creator: who not one mite, or portio of a part hath sited any where, that serueth for no end, or vtilitie to the body: for how fit to apprehend are the handes, and how prompt to moue are the fingers, who is it that knoweth not? which made *Aristotle* call them instruments, or organs, before all organs, or instrumentes: and they are prest, necessary, and exquisite: wherefore sayth *Galen* in his first *De v. partium*: as they might not be created without bones, neither had it bene requisite for the to haue bene made of one bone: but to euery one 15. knit together by ioyntes: thereby to become prompt to euery actio. For often, we made not to extend, or to reflect, and bowe all at once, but sometyme the first onely, or second, or thyrd ioynte, sometyme the first together with the second, or the second and the thyrd, els the thyrd, with the first extendyng, or bowyng: by the which, *Galen* expretheth the v. general differences of the figures in apprehending, or holding: but the particulars, which are brought to passe as occasion is offered, either more, or lesse, he accompteth innumerable: so (sayth he) if the hand had not bene deuised, it had also behoued eche thyng we should handle, to be of equall bignes: but now being (in dede) deuised into many partes, we are no lesse able to apprehend with facilitie greater thynges, then ready, & nimble to touch eche little substance.

Nature therefore (as *Galen* in the place before cited sayth) finely framed fine fingers in either hand: so that as nothing might be wanting, neither should any thyng be to much. For thinke not, that rashly nature created one finger longer then the other, since thereby they obtayne this notable propertie: that although, when they be at libertie extended, some surmount their mates clearly in length, yet that is wonne agayne, when we comprehend any thyng within the compasse of them, or hold any liquid substance within the palme of the hand: for then you

It. 15.

will

The handes are organes most convenient for a wile creature.

The handes are the organes of artes.

Os Ilium.

Os Ilium in children three, in man one.

Os Ilium.

Os pubis.

Os coxendicis.

The seate of foederation of bones.

All bones above and beneath Ilium, and Sacrum, do move, but they only not moved.

Ilium groweth to Sacrum inseparably.

Where these 4 bones ioyne.

The figure of Ilium.

The use of the apertures in these bones.

The description of the superior part of Ilium.

The spine in this what and the use thereof.

Joyned by nature

will confesse this inequalitye of the fingers, to present a most manifest vtilitie, and decent kynde of fourme. Finally this his saying is also woorthy to be noted. As man, of all other creatures, is the most sapient, & wise: so also hath he handes, the most convenient instrumentes to a sapient creature: yet not in that he hath hands, therfore he is the wisest, but because he is wisest, therfore he hath handes: for not handes, but reason instructeth man in Artes. So likewise, the handes are the instrumentes of Artes: and thus much of the fingers, the last part of the had.

The next that followeth in order to intreate of, after the partes, whiche we haue already gone through, is that bone, which is committed, and ioyned to the transuerse Processe of *Os sacrum*. In persons of full growth, and ripe yeares, although it seeme one bone, yet is it esteemed of, as if it were ij. and the reason is, because in children and youthfull yeares, it is by a Cartilage interfectured with iii. lynes: therfore (also) it is decuded by Anathomistes into iij. partes chusing iij. diuers names: for the supreme part thereof being the broadest of the rest, and committed to *Os sacrum*, is called *Ilium*: as an other part is that, which being not so broad: as the superiour, is thorowed on each side, with a large & ample hole, and is called *Os pubis*: then the middle part, which is streter, and thicker, & outwardly engrauen with a deepe & large caue, is called *Coxendicis os*. These bones are ij. in number: that is to say, on either side one: which although they be ioyned to *Os sacrum*, yet their propozition seemeth to answere no lesse vse, then the scaple bone vnto the shoulde: for these after the same rate receiue the thighe, as those do the shoulde: and also the originall, and diuers insertions of Muscles. But as before we haue sayd, they being ioyned to *Os sacrum*, do minister to all the composition of bones, that most necessary seate, and ground: for these being ther perpetually abiding, are neuer required of any motion: when as all other members about them, of very right, do styre and moue: which most euidently we may discerne, in seying all the motions both of the superiour, and inferiour partes excellently percurrent, and yet at length to cease, or end at these bones: as if were, there certaine centre, and pynck: for *Ilij ossa*, are so firmly to the same *Sacrum*, committed, as that they seeme wholly growne thereto: wherfore *Collumbus* recordeth of a Sceleton he hath, whose *Ilium*, on the left side, is so conuatted, & growne to *Sacrum*, as that it may not, by any meanes, be disseuered. These same bones likewise in the foze part, do meete, and ioyne together. Their bearyng outward, is esteemed to represent the figure of a bason: which nature so ordayned, for the safer containyng and holdyng of the matrice, blood, and intralles: to the safetie of the which, these bones are chiefly prest. The figure of these bones is diuers, for on the hynder part they be broad, and insigned with ij. cauities, whiche rather seeme crooked, or holued, then hollowly excaued, or engrauen: since it is euident, that the same partes on the contrary side, are asmuch conuexed, and Gibbous: whereas also much asperitie and roughnes is, chiefly outwardes, and seruyng to the insertion of Muscles.

The upper region of this part of *Ilium*, being drawn after a Semicircular lyne, is clothed with an Appendance all a long the same copasse. And because it is somewhat prominent outward, therfore it is called the spine, or ridge: from whence especially flow Ligamentes, and the exorture of these Muscles, that constitute the buttockes: as also, those that downwardes to the thigh, and legges, and upwardes to the brest and backe, are caried. As touchyng their fastnyng vnto *Os sacrum*, nature hath decreed a mutuall congreffe, whereby their composition is made more strong, and pertinacious: wherfore, the transuerse Processe of *Os sacrum*, as they are excised, and engrauen, somewhere with large and deepe, other where, with lyght and shallow concauities: so likewise are these bones in the seying to both, endewed with convenient cauities, as also other make portions

bounced forth, and protuberated. So that in meeting together, the hollow places of these, receiue the roughe knottes, or eminences of *Os sacrum*, and in lyke manner, their protuberated or swelled portions, are admitted into his agreeable cauities. And this congreffe is mutuall: to the which vniou, a Cartilage also is intercedent, which, after the maner of glew, holdeth, and ioyne them together. Wherby there Articulation may be thought like *Ginglymon*: but since no kynde of motion is atchieued thereby, we accompt it more like vnto *Symphisis*: and thus farre the description of the superiour part.

Now, that portion thence declining towardes the Anterior partes, occupieng the middle space of the bone, and endewed with the name of *Coxendicis os*, is most thicke: that the more commodiously therein (and without to much weakenyng, or decaying the bone) might be made the large, and deepe hollow, or cuppe, into which is inmitted the long, and round head of the thigh. Wherfore it is called a cuppe, or bolle: which although (in dede) it be of it selfe very large, yet because it could not be so deepe as wholly might containe the head of the thighe, a Cartilage is thereunto added, as is betwixt the scaple bone and the shoulde: wherby the hollownes thereof is fulfilled at large. And this cuppe, or concauitie, not onely occupieth part of *Coxendicis os*, but of *Os Ilium* also, and *Os pubis*. And besides that Cartilage, which in maner of a crust circundeth and compasseth a round the head of the thigh, as the cuppe wherein it is contained, there riseth about the borders and edges of the same hole, a certaine thicke, & circular Cartilage: which nobly augmenteth the capacite thereof: and so completeth the deepe head of the thighe, that, not without great rigour, & extreme violence, it may be fro his seat lurated. And further, to the end y head of the thighe might yet more firmly, and safely rest, within the same acetabulum, or cuppe: out of the midst of his crustie Appendance, groweth a round, and most strong Ligament, whiche is likewise fastened in the midst of the same concauitie: and in this maner is firmified his Articulation, which otherwise was slacke and lose.

The inferiour parte, whiche is intersited betwixt *Ilium*, and *Coxendicis*, is endewed with a notable kynde of hollownes, hysing out, or cut through in the lower part: so that it is a way euident, and open on each side, or common to both the bones, ordayned (as we may easily suppose) as a way, for the subduccion of very many, and large furcles, and bzaunches of Spines, profluent from the spinall marce, through the holes in *Os sacrum*: the which, after, not fare thence, do coite and ioyne together in one, the greatest of all the Nerves in the body: which downwardes is disseminated, amongst the Muscles of the thighe, and legges: as more in the history of Nerves. But, departing from this corner, or deepe niche, more so wardly, there riseth a certaine sharpe Processe, whence is produced a Ligament to be inserted vnto *Os sacrum*, prepared to inclose the fundamēt, and that greatest Nerue lately cited. Agayne, besides this Processe, neare to the bottom of seate of *Coxendicis*, there is an other hollowed corner, being broad, but more shallow then that before sayd: and is (as it were) cut here and there in the midst, with certayne chynkes, to the which are inherent foure tendons: recondited, and hidde in their Muscles, as if they were in a purse imposed: whiche at length also do agree together in one, to be sent, and solued in the thighe. The inferiour portion of the thighe is most thicke, which therfore is nominated the seate, or foundation thereof. This one amongst all other partes of *Coxendicis os*, is endewed with one Appendance, whence springing the ij. Muscles, that serue to bolue the legges. And now it resteth to speake of the Anterior part which is named *Os pubis*: being thinner both above and beneath, then the rest: these, the nearer towardes their midst, are the more also attenuated, vntill they become cleane through perforated, and that with a most large hole: about they are ioyned together,

The use of this mutuall congreffe.

The Cartilage in these bones, is called, *Colla*. It by its nature is hard, and is to be receiued rather to synchise then to enligament.

The description of *Os coxendicis*. Why it is so thicke. The use of the cuppe or concauitie in coxendicis.

The Cartilage circumscribing this concauitie.

In what partes this concauitie is made.

The articulation of the thighe the cuppe answereth in proportion to the shoulde with the scaple bone. A circular Cartilage augmenting the concauitie and why.

The Ligament within the concauitie the situation and vse.

The hollow concauitie betweene *Os Ilium* and *Coxendicis os*. The vse of the hollow corner.

The beginning and terminyng of the greatest Nerue.

The sharpe processe and the vse thereof.

The vse of the hollow about the seate of coxendicis.

Four tendons in these bones are in a purse concondited. Why the inferiour part of coxendicis is thickest.

Why the Rat of coxendicis hath an appendance.

Of the bones of Pubis. Callid.

The holes of Pubis.

How the bones of the right and left are joined together.

To say that the bones in children are open is a laughing matter.

The bones of Coccy are in children retracted.

In the largeness and narrowness of Pubis men differ from women.

How the bones of Pubis in women are distinguished from those in men.

The bones of Pubis are not dilated.

Why the bones of Pubis are downward bifurcated.

What signifies the superior part of Pubis.

The inferior part of Pubis hath an appendance.

The situation and original of the Muscles sustaining the yare.

The hole in the middle of the bones of Pubis why it is made.

A distinction between the Muscles that turne about the thigh.

The course of the feminary vessels.

Why this gutted canitie is adus distinguished the bones of a man and woman yet I have seen them absent in the bones of a man.

Holes in these bones for the derivation of nourishment.

How onely and the bone hath the bone in the thigh greater than the other bones.

The thigh is thicker than the leg in other creatures.

The figure of the thigh.

The head of the thigh.

The necke of the thigh.

ther, the right meeting with the left, by the interuenture of much Cartilage: the which knitting is so firme, and solid, as hardly with the knife, it may be separated. Wherefore, great occasio of laughter is offered by such as haue not bene admonished, openly to publish so much, that these same bones, should in women byrnyng forth, be loosed, and departed one from an other, thereby, that more easily, the byrth might be extrahed. Notwithstandyng, it is verified in the taylor bone, as we haue sayd before in his proper place. For that is certainly retrahed in women, helping greatly to the byrnyng forth of child: but to affirme the departing asunder of these bones in such seasons, is, no doubt, a saying so absurde, as what to be moze, I know not: since it seemeth nature was nothing forgetfull of the byrnyng forth, & increase of young childre in making the womans mould: but if it were so, why then in bayne, did she constitute these bones in women of farre larger scope, and compasse then in men? A thyng notable to be marked. By this therefore, it is nothing difficult, to descerne these bones in women, from those in men: for in men they be moze streit, and narrow, both aboue, and beneath: but in women much more ample, and roomly: wherefore let no man beleue *Os pubis* to be dilated or opned in child bearyng.

But now agayne from the same coniunction in *Pubis*, which we haue sayd to be confirmed by a Cartilage, the more downwardes they go, so much more and more also one side seuereth from an other till they haue left a boyde, and empty corner, for the subsistyng of *Penis*, and the Testicles. And in the superiour part, where these same bones of *Pubis* are conioyned, as is aforesayd, they are one each side rough, and aboundyng with a double Tubercle, or protuberance, and bounded position: from the which haue spring both the straight Muscles of the belly, as also, those that be deferred downe to the thigh, and legges: and abyde the insertion of the oblique descendentes of the belly. But from the inferiour part, so armed with an Appendance, are produced the Muscles susteyning *Penis*: whose body is situated, immediately, after the union of these bones. That large hole in the middle, being supposed rather for lightnes sake, then for other cause to haue bene made, two Muscles, an outer, and an inner do fulfil: which stretching thence downwardes, and implanted in the thigh, minister thereto the power of circumaction, or turning about: betwene which, runneth a tough Membran, both shutting the way of the same hole, and distinguishing the one Muscle from the other. Then (henceforth) let them with more modestie aduise them selues, that heretofore, haue rashly affirmed the feminary vessels, by these holes, to descend vnto the Testicles: when as it is most euident, they perforate the Muscle of Abdomen, & aboue these bones are caried. In which on each side is a certaine litle hollow gutter, in their toppe obliquely declined, or bendyng ouer, by the which covertly runne, as well *Deferentia*, as *Preparantia vasa*. But this canitie in women is not found: which is the chiefest difference, betwixt those bones in men, and women.

And thus Iudge of the bones committed to *Os sacrum*, being not much different from the same in substance: for they be fungie, and light for the most part, not very hard, but replenished with holes, or litle porie places for the receipt of nourishment perpetually to cherish them.

The thigh bone neither in byrdes, neither almost in any foure footed beaft, is in length comparable to the bones of the legge, exceptyng the Ape: but in man, it most playnly exceedeth all other in magnitude, and is Articulated aboue with *Coxendix*, *Ilium*, and *Pubis*, but beneath, with *Tibia*. The figure of the thigh is long and round, but not euery where straight: for neare vnto the middle it crooketh, being therfore in the fore part gibbous, but in the hinder and exterior part sinuous, and (as it may be sayd) backwardes bendyng: the uppermost head is thicke, round, & ouer cruised with a Cartilage, haung the necke thereof, which

is

is long, much inwardly pressed. And this same head to that necke supposed, is almost wholly affourmed by an orbicular Appendance, & is admitted within the acetabulum or cup of *Coxendix*: wherein (as before I haue largely declared) it maketh a most firme, and strong Articulation, being no lesse needfull, for the erectyng great waight that the thigh ought to susteine. Wherefore nature, not acceptyng it sufficient to make a large hole for the entrance therof, nor inwardly to clothe it with a Cartilage, and in like sorte to augment the borders thereof, whereby sufficient roime might be offered to the same head, hath prepared likewise a round, and strong tyng, to procede almost from the middle toppe of the same head, and fastened the same agayne in the botome of the acetabulum, or cup, as a stable groid, and strong firmament. Which being so, their opinions, are accompted bayne, which, iudging this ioynt neuer plainly lurated, do terme it onely a ballard, or false and counterfaieted iuxation, when as (in verbe) it is perfect and true: since it often tymes falleth out, that this Ligament, wherof we last made mention, is relaxed, & slacked, to the great ruine of the member, & difficultie of restitution.

This same bone, immediately after the necke, descendeth with a certaine litle broad portion, out of which are caried two Processes like knottes, which in infantes hold the nature of Appendances, and may be taken of, though in proress of tyme they cleave so close, and are so voted in the partes wherein they are prominent, that no signe of Appendance is presented by them. Their seates are (for the most part) on the hinder partes, and one higher then an other. The uppermost being greater, looketh outward, but the neithermost being much lesse, posseth rather the inner seate. The greater I Greceas call *Rotatores*: but both are to be named *Procuratores*, that is to say *Rotatores*, because they seeme to be ordained for the turning, and wheelyng about of the thigh. For they admit the insertion of those Muscles, by whose benefite both the thigh is outward flecteb, moued, and caried, as also circumuerted or round turned: yeldyng an apt beaymyng: to the big, Muscle of bowyng the legge.

In the posterior part is eminent a certaine lyne, taryed from the outer Process to the inner, and as it were ioyning, or tyng them together: and from hence begynneth the thigh to take on him the shape and forme of roundness: whence forward, being gone beyond the middle region, the more it descendeth the more also it engroseth, and enlargeth, being inwardly flatter, and at length goeth forth in two great heades, rough on the outside, & altogether vneuen: but their endes, or extreme faces be smoth, couered with a smoth crust, and are constituted, and finally made, by the interuenture of a mighty Appendance. In the posterior part, these heades are denided with a great, and large chinke, or hollow space, but before, more lightly depressed with a comon canitie, wherein lyeth the hole, or rotule of the knee.

But as touchyng the feuerall description of these, we cannot affirme one, in fashion like an other: for the innermost is thicker, and the outmost playnly broader, and more depressed, least both should be alike Articulated vnto the legge, for the oblique motion sake: especially when the legge should be bowed to the exterior partes: to the which motion is destined the Muscle lurking vnder the hame, whose originall is from this outermost head, towardes the posterior partes, & uie there, wher as it is rough, & imressed with certain litle corners, or canities.

The composition of the thigh with the legge is called *Ginglymon*, because one mutually receiueth, and is receiued of an other: as the upper head of *Tibia*, or the bone of the legge, haung y. canities, or hollowes. For the y. lower heades of the thigh, hath also betwene those two canities, an eminent position protuberant, which is also receiued into the posterior hollow, or gutter of the thigh: from whence floweth a most strong Ligament, to bynde together the thigh with the legge,

And

legge,

How and why the thigh hath so strong articulation.

The Cartilage.

The Ligament.

The error of those continuall which suppose this ioynt neuer plainly to be iuxated.

How the ligament of the ioynt of the thigh is made different to the rest.

Col. Lib. Cap. 19. The practices of the thigh in new borne children, some appendances.

The description of the Processes of the thigh.

Procuratores what.

The title of the Processes of the thigh.

How the Processes of the thigh are iuxated.

Whence the thigh is round.

The description of the thigh in length.

The appendance.

The chinke or gutter that denideth the inferior heades.

The place for the rotule of the knee.

The y. inferior heades of the thigh compared together.

The legge how it boweth to the knee.

The originall of the muscle vnder the hame.

The composition of the thigh with the legge is by Ginglymon, but with the hippe by Enatholion.

How the articulation of the thigh with the legge is done also with a Ligament.

Wherin the articulation of the hippe is notable from all other ioyntes.

The line in the posterior region of the thigh.

The use of the line of the thigh. The greatest muscle in the body. How we purchase straight standing. The benefit of Alperities in the thigh. The use of the thigh.

Why the inner concavities of the thigh is large.

Verines.

Tibia comprehendeth all that space between the knee and the foot, called the legge, containing 11 bones, of which the greatest chiefly beareth the name. Tibia and Fibula compared in proportion to Radius and Cubitus. The names of the lesser bone of the legge. Appendances. The description of the superior part of Tibia. The industrie of nature. The movable cartilages of the knee. The use of the 11 in the upper part of Tibia.

The movable cartilage of the knee whereby the room of a Ligament.

The tubercle of the proccesse between the cauities.

How the proccesse of Tibia in posterior cauitie between the 11. heades of the thigh.

The legge downward as it were 11. square.

legge, in like sorte, as is lately sayd by the knittynge of the thighe, with *Coxendix*. And for this kynde of Articulation, that is to say, so noted with a strong Ligamēt within the ioynt, as is this thighe, both above, and beneath, beside the outward obductions, and clothynges with Ligamentes, whiche is also common to other ioyntes, it is odde, and unlike to all others: and therfore is notable to be spoke of.

Furthermore in this bone of the thighe, is to be noted a certaine euidēt, and rough lyne in the posterior region, begynnynge not farre from the innermost of the upper Proccesse, called *Rotatores*, and so, on the same region of side, brought downe after the longitude of the thighe: and, beyond the middest, deuidynge into two partes, or courses, seemeth to reach vnto both the heades, but most apparantly endeth at the outermost. This noble lyne, least you ouer lightly way it, consider, and know how firmly, the eight Muscle of the thighe, which is the greatest of all the Muscles in the body, and by whose benefite our straight standing is made, is thereto fixed and knit. There be also diuers other Alperities, and rough partes, not without some impressiōs, all made for the cause of Muscles seates, insertiōs, and so forth, as hereafter shall be more fitte to say how.

By the thighe, we both sit, and stand by right, as also more towardes every thyng. For, from the Articulation therof in the hippe, no manner of motion is exempted. The concavities therein, for lightnes and the containynge of medullous nutriment, is very large: not unfit for the largenes of the bone. As for Verines, that perforate the substance thereof at either end, let no man doubt of: for besides that they are euidēt, know that Nature willet no part in the body to live without blood.

And thus this large bone of the thighe endeth, above, at *Coxendix*, and beneath, at *Tibia*: whiche we call the legge: wherewith although there be by another bone ioynted, that is to the side therof, all a long the length of the legge, yet this beareth the name, as it is in dæde most notable. For in the legge are two bones, like as is sayd in the cubite: but the one farre greater then the other, and that therfore possesseth the hole name of *Tibia*, or *Crus*. The lesser hath sundry names as *Sura*, *Fibula*, and of the barbarous sort, *Focile minus*.

This *Tibia* is clothed with an Appendance at either end: but the superior part therof is both broader, and also thicker, haupynge in the toppe, two cauities lightly erculped: betwene which, riseth a prominent, and rough tubercle, as I touched euen now, in describynge the Articulation of the thighe with the legge. These cauities admit the heades of the thighe: wherin Nature well foreseeynge, hath provided, least for the quantitie of the heades the cauities should be to much depressed. Therfore besides the common Cartilage, wherewith either of them are incrusted, nature aloft hath layd another, movable, and soft, representynge the figure of the Bone of the similitude of this letter C. About the borders therof the same is thicker, but the more towardes the centre or middest, the thinner: & endynge first before, it toucheth the centre: thus the profunditie of the cauities of *Tibia*, are left sufficient great. Wherefore chiefly it seemeth this Cartilage, for that purpose to haue bene ordained. Which as it is light, soft, and unctuous, or full of humiditie: so doth it serue as the turne of a Ligament, and much auayle to the active moing of the ioynte. Likewise that bunched, or protuberant part, that emergeth from betwene those cauities erculped (as also sayd) in the upper extremitie of *Tibia*, maketh not a litle, to the confirmation of this ioynt by being immitted into that large cauitie of the thighe: and not onely so, but also bounde thereto by a strong Ligament proceeding from the toppe of the same knot, or tubercle: and thus strongly is this ioynt armed, and holden in on each side.

After, proceeding downeward from the superior part of the legge, we finde the same here, and there, attenuated, and lighted with long lynes, and flatted sides,

sides, in such sort, as that the whole proportion betwene the 11. heades, or endes therof, is (as it were) 11. square, obliquely stretchynge and incuruated principally in 11. places: easily giuynge place to the Muscles thether descendynge. But on the outside towardes the hinder partes, there lyeth a certaine light cauitie spread ouer with a Cartilage, whereto leaneth the inner part of the head of *Fibula*, and so in the upper part it is ioynted with *Tibia*. From the middle toppe of the posterior part therof, is drawne out a declined, or crooked cauitie, for the transiture of a Veyne, Arterie, and Sinew, which that way downewardes are intrinched, to do (as others) that they owe to the lower partes.

And in the fore face, and upper part, not farre from the end of the Appendance whiche is sayd to be so largely plated vpon the toppe of the legge, is a certaine rough eminence, admittynge the insertion of Muscles, such as extend and stretch forth the legge. From whence, all after the middle region, is produced a sharpe line comparable to the ridge of any thyng: wherfore of same it is so named.

And this inner syde of the legge is the part we call the thimne, accompted to be without flesh, whereas all others, and chiefly the posterior part is supplet, and filled with much stoe of flesh.

The second line which lieth vnder *Fibula*, directly towardes it, is made, to the end that there hence might a Ligament be produced, whereby *Fibula* with *Tibia* connected, and knit: and (like as is sayd in the cubit) the anterior, from the posterior Muscles are thereby distinguished.

Agayne the inferior part of *Tibia* towardes the end wareth also thicker, but the head therof, less then that in the superior part, and the extreme end excised, and cut into one onely large concavities, which is not frustrate of the benefite of a Cartilage: wherunto is admitted the insertion of the bone *Talus*. The inner side of this neither head of *Tibia* goeth forth like a thicke Proccesse, overreaching on that syde the late sayd cauitie: by reason whereof, *Talus* seemeth as though it were underfet, on that side, for slippynge out.

Contrarywise the other side, not being able to yeld the like, for that it behoued it rather to offer a long hollowed corner wherein to lodge the lower part of *Fibula*: and agayne, since it were aswell expedient for that side to be defended fro each light luration as the other: see the deuise of nature, in stretchynge forth the head of *Fibula*, as farre beyond the head of *Tibia* in this lower part, as vntoward the legge surmounteth it in longitude: wherby is fulfilled in it, that whiche might not be one that side brought to passe in *Tibia*. For here it becommeth as answerable to the outside of *Talus*, as the Proccesse one the inner side extended from *Tibia*. These are they which commonly in our English phrase we call the Ancles. The Proccesse of *Tibia* being the inner ancle, and the outer head of *Fibula*, these 11. make strong resistance, least *Talus* to *Tibia* articulated should on any side slippe fro his seate. But when such luration hapneth at any tyme, we see it more comonly to the inner side, then the outer side: because the outer is longer produced then the inner.

Whoeuer that Proccesse of *Tibia* which we call the inner ancle, in the posterior part therof, hath a cauitie, whence is extract a Ligament, wherewith *Talus* to *Tibia* besides is allgated, and bounde. And further, that this knittynge might be more firme, no small ayde yeldeth that litle long and rough corner, tranfuerfly caried, whiche the Anterior seate of the Appendance of this inferior head of *Tibia* putteth forth: for hereto springeth a Ligament knittynge the necke of *Talus* to *Tibia*.

But here you must vnderstand, that the ioynting of *Fibula* with the legge is after no other order, then as we haue declared before, in the knittynge (in the arme) of *Radius* with *Cubitus*: yet ascendeth not so high, as that it any thyng at all toucheth the bone of the thigh: and downewardes contrarywise, descendeth lower the

Why the legge is covered partly in three places.

How it is ioynted to the legge. The cauitie receiuing the decliō.

The insertion of the muscles that stretch the legge. The spine of the legge.

What is called the thimne.

The use of the second line in Tibia.

The description of the intricate part of Tibia.

The use of the inner proccesse of the neither head of Tibia.

See the manner how art of nature

Col. Tibia. Cap. 30. The 11. ancles why they are.

Why location of the force rather directly to the inner ancle then to the outer.

The figure and use of the inner ancle.

The neck of Talus knit to Tibia.

Fibula toucheth not the thigh above.

And so a slender Sinusculus.



the legge, for what end and vse, we haue sayd: ech structure, and combynation therof, being by *Arthrodia*, vnder *Synarthrosis*.

Both the heades of *Fibula* stretch forth into a sharpe Procelle, enclowed, and shaped with certayne roughnes, to the vppermost of which, being more round, are inserted the Muscles mouing the legge, but the inferiour, which is more deperesced and also outwardly more Gibbous, sendeth forth Muscles seruyng to the extreme part of the foote. And both these heades, inso much as they are receiued into there pproper canities, are clothed with a Cartilage.

To speake therfore wholly of this same *Fibula*, the small bone of the legge, although it be straight, or at least but a litle crooked, yet a great space of it departeth fro the same *Tibia*, but farthest of all in the superiour region therof: because there also *Tibia* is more hollow flected, then in the whole space besides.

And in this distaunce, may you discern the Ligament lately spoken of, complayng together the legge and *Fibula*, in the middle space, and separatyng the Muscles, by which, those spaces of the legge on eche side are fulfilled: to whose insertions, and situations, much seruicable is the inequalitye of *Fibula*, ensigned so with apt canities, and lines, whereby it is in like sorte trianguled, or thre square: as *Tibia* receyvneth a safe roome for the marey, so *Fibula* wanteth not wher in to cary this nourishment.

In the fore part of the knæ, at the ioyning together, or coarticulation of the legge with the thigh, is a certayne bone deuised from them both, yet not refusing seruice, but is common to ether of them: and called of the latines diuersly: as *Patella gemm mola*, *scutiforme os*, and *Rotula gemm*, in English the Patell, the Rotule of the knæ, the shieldlike bone, the eye of the knæ, &c. the substance therof is not Cartilaginous as some haue thought good, neither yet altogether hard, and Solid, as others would affirme, but rather as it were the substance of some hard Appendance: to the end it might be apt to receiue nourishment into all the partes therof. Notwithstanding that, it is inuolued, and wrapped about with a slippery Cartilage, especially on the side towardes the thighe and legge, the other as clothed with the tendons of Muscles. This Patell was ordained to couer the ioyn betweene the thighe and legge, which otherwise had bene to open, and prone to be lured forthward. It yeldeth also that the knæ might directly be bowled to a corner. So it ought to be mouable, and not stubbornly cleauyng, for makyng the motion hereof difficulte, but with his Ligamentes, and those of the thighe, it is knit vnto the legge though others say it is onely holden thereto by the tendons of Muscles. For from the Appendances of the thigh, and legge, arise Ligamentes, wherewith manifestly the Patell is bound on eche side, but to the thigh it is articulated by *Ginglymon*. For the inferiour part of the thigh hauing two heades, as I haue sayd, leaueth the middlest a hollow corner, into which the middle protuberant part of the Patell is immitted: which, that it might the better fulfill, and more commodiously cleaue vnto it, it is here and there noted with canities, answerable to the protuberant poztions of the head of the thigh, wherfore accordyng to that kynde of Articulation named, the Patell both receiue, and is receiued of the thigh, the fashion therof is almost round, goyng out somewhat sharpe (as it were) where it sitteth to the legge, & therfore it obtaineth the name of a shield. In the sides or extreme partes it is more light, and thynne, but the more nearer the middlest the thicker, and bolseth out the more evidently. It presenteth an incommo ditye: sayth Galen) least in bowyng the knæ, the thigh should slippe over the canities in the toppe of *Tibia*. And not meaneley stayeth vs fro falling whilest we descend downe some hill, or crooked place: when as the whole body beside is wayed backward. And thus much of the superiour members.

Now

The vses of the  
aspiration of the  
joints of the  
bones.

Cartilage of the  
bones.

The distaunce be-  
tweene the bones  
of the knee, and  
why.

The lines and  
inequalitye of  
the bones of the  
knee, to what vse.  
Their inward  
hollownes.

The whylebone  
of the knee is com-  
mon in vse both  
to the thigh and  
legge.

The explanation  
of the names of  
this bone.  
The substance of  
the bone of the  
knee.

Col. Cap. 32.  
Why the rotule of  
the knee is not  
solid.

Where it is lap-  
ped in a slippery  
Cartilage.

The last vertice  
of the bone.  
Why it is mo-  
uable.

The Rotule hath  
his proper liga-  
mentes against  
the common opo-  
nion.

The vinge of  
his proper liga-  
mentes from  
whence.

The Patell is ar-  
ticulated to the  
thigh by *Ginglymon*.

The figure of the  
patell what kind  
of one.

Where the Patell  
is toucht, and  
waied sayth like  
the middle of a  
buckler.

The notable vse  
of this Patell  
bone of the knee.  
Lib. 1. cap. 32.  
Cap. 33.

Now it resteth to speake of the bones appertaining to the foote, and wherof the foote is enclowed and made: The number of them is xviij. obseruyng iij. orders in the foote, lyke as in the hand. For the first part, which immediately succedeth the legge and *Fibula*, being called *Tarsus*, is answerable to the wrist of the hand. The second, called *Pedum*, is comparable to the Polibrachial bones. The thyrd order is destined to the ioyntes of the fingers. Whely this difference is betwene them: that the bones of *Tarsus* are but vij. in number, and they of the wrist are vij. wherby it hapneth that the hand surmounteth the foote by one in number, but to *Pedum* are v. belonging, as many as are numbred of the *Polibrachial* bones, the other iij. are deuised among the ioyntes of the fingers, as well in the foote, as the hand.

Neither sayth *Columbus* do I see, why from the bones of *Tarsus* the thyrd first should be disioyned, as other Anatomistes haue thought good, grauntyn that the iij. last bones, whiche alone (say they) merite the name of *Tarsus*, ought onely to be compared to the wrist, without mention of the other iij. The therfore thinketh good to complet both those iij. as also the other foure followyng vnder the name of *Tarsus*: as when we depart from *Tibia*, and *Sura*, descendyng forthwith we come vnto one maner of ioyning together of bones, as if were a naue, which we compare vnto the wrist followyng *Cubitus* and *Ulna*. But euery one of these bones belongyng to *Tarsus*, haue not peculiar names giuen the: for the first thre are of some (in their diuision) remoued from *Tarsus*, and one of the foure followyng obtaineth a proper name, but the thre last are hitherto altogether vnnamed. The first of all therfore is named *Talus*, the second *Calcus*, the thyrd *Scaphoides*, the iij. *Cyboides*, the other iij. although they go vnnamed, yet by number, fourme, and situation they are distinguished.

And now to describe them all in order, *Talus* being first, prostrated vnder *Tibia*, and *Fibula*, and subiect to their Appendances, although it seeme onely substrated to *Tibia*, is in fourme boluyng out about lyke a round heaued, or swelled thing, imitatyng in compasse the fashion of halfe a whele, or if I may to liken it to the whele of a pulley: for in the middlest it is guttured, or hollowed, though not so deepe, but lightly, so that the sides onely maie be discerned higher wherby it is coupled with the bone of the legge. For the Appendance therof is so for the purpose engrauen, to admit this head of *Talus* into his fit seate, after the kynde of articulation called *Ginglymon*. And this maner of the ioyn serueth to the bowyng, and reclayng of the foote: the which motion ech walkyng creature continually maketh: which, to the end it might be made more easie, and with lesse labour to the member, or lest the bones by much wearing, should be wasted, either part, both of *Tarsus* and *Talus*, are plentyfully encrustet with an Appendance, perpetually to endure the foetes incessant motion. *Talus* is on eche side declined, and as it were cōpelled, where the Ancles are placed, neither yet without the ouer spredyng, or deffensue clothynge of a Cartilage, although not on eche side of like sort. For the inner side is onely cōpelled about in smal scope and amplitude, because the Procelle of the inferiour Appendance of *Tibia* constitutyng the inner ancle, and comprehendyng this side of *Talus*, is not in such ample space, encrustet with a Cartilage: but the outer side of *Talus* is largely sinuated, & in greater space bearyng the obduction of a Cartilage, to the apt constitutyng of a seate congruent to the inner side of the lower Appendance of *Fibula*, which maketh the outer Ancle: and differenyng lower then the inner, the inferiour part of *Talus* is hollow, & clothed with a Cartilage, and lyng wholly vpon the face of the hale bone: but so notwithstanding, as that the same obtaineth a half compassed canitie: which admitteth the middle regis of the hale bone thereunto preadynge, & accordyngly fourmed. And as the interior side of the inner Ankle possesseth a rough canitie, out of

L. iij.

which

The number of  
the bones in the  
foote: and wherof  
each is called.  
Three orders of  
bones in the foote.  
The first order of  
bones in the foote  
is: comprised to  
the wrist of the  
hand. The second  
order of bones in  
the foote is: be-  
tweene the bones  
of the hand and  
of the foote.  
The number of  
the bones to Tar-  
sus.

The number of  
bones to pedum.  
The bones of the  
fingers both of  
the hand and  
foote are  
xviij.

Col. Cap. 32.  
Why in the bones  
of *Tarsus* Col. 32.  
differeth from other  
Anatomistes.  
*Talus*.  
*Calcus*.  
*Scaphoides*.  
*Cyboides*.

The description  
of *Talus*.

*Talus* to *Tibia* is  
articulated by  
*Ginglymon*.

The vse of the  
articulation to the  
foote.

The vse of the  
cartilage to *Talus*.

The sides of *Talus*  
declined & cūen.

What constituteth  
the inner ancle.

The inferiour  
part of *Talus*.

V. 32. Lib. 1. cap. 33.



How Talus is bound to the ankle.  
The use of the articulation in Talus.

The use of the articulation in Talus.

The figure and use of the articulation of the ankle.  
Col. Lib. 2. Cap. 3.

How the foot is by obscure motions is moved.

What is under the bone by the anterior and posterior part.

The use of large cavity in Talus.  
The description of the bone part of Talus.  
The substance of the bone Talus.  
The error of those that esteem the bone Talus to be solid.

The bone & names thereof.  
The magnitude.  
The substance.  
The description of the upper part of the bone where it is committed to Talus.  
The articulation of the bone with Talus is by Ginglymion.  
The description of the first part of the bone.

Why the bone backwards extends the vertebrae of the leg.  
Why the inferior part of the bone is broader.  
Why it is rough behind a transverse process.

A question in matter where in Africa spurs.

which springeth a Cartilaginous Ligament, for the binding together of *Talus*, and *Tibia*: euen so, for the receiuing of the same Ligament, the inner side of *Talus* hath a rough cavitie, or hollow, euen as the outer side thereof is likewise hollowly engrauen, that thereto might be inserted the Ligament brought from the inner side of the outer Ankle. For the like cause also is the hinder part of *Talus*, about the rate thereof rough, to admit and receive the Ligamentes whose begynnings are in *Tibia*, reaching others to the heele. But besides this sayd asperitie or roughnes, the posterioir seat of *Talus* sheweth also hollow or concealed places to the tendons of Muscles that are caried to the foote, and goe vnder the inferiour partes thereof. And in this manner is *Talus* articulated to *Tibia*, as also, the superiour posteriour partes and sides, are fourmed as is sayd. The Anterior part of *Talus* stretcheth forth his portion like a necke, whiche endeth at a round head, not destitute of his crusty cover, whiche is admitted into the large, and rounde sinuated side of the Boatelike Bone: by the benefite of the whiche ioynte, the foote (although obscurely) moueth outward, and inward, as also both as (it were) somewhat turne about. But in the posterioir part it is after a manner prominent, that is, where it is receiued of the inner and posterioir part of the heele. We call that the posterioir part, which, descendyng down from the head, first offeth it selfe vnto vs: and that further froe the remoued, the posterioir. But in vniuersiour part on the outside of *Talus* is a profound cavitie, augmented by an answerable cavitie on the same side of the heele bone. In this cavitie is contained a certaine murous, or slimie substance, together with fatnes, so prepared to the moystnyng & amoynting of those bones: lest els much moyning should drie them, and they dyed, consequently their office frustrate. Finally *Talus* lyeth downe in the foze part, and is extended vpon the heele bone, as it were into a double Process, that is to say, where it respecteth the inner region. And thus is shewed the first bone called *Talus*, which (notwithstanding) is likewise so sinuated, and hollowed, as not onely it admitteth the insertion of rising rather of Ligamentes, but also aptly giueth place to the tendons of Muscles, brought thither for the moyning of the toes as is afore: onely this more we haue to say, that the substance thereof meriteth nothyng lesse then to be called Solid, for asmuch as (though contrary to the opinions of some) we finde it spongie, and replete with many holes.

The second bone in order ensuyng is called the heele, or heele bone, or of others the Spurre of the foote. In magnitude it farre exceedeth all others of the foote, neither differing in substance much from *Talus*, vntil it seeme somewhat more fungous, and not with so hard a crust munit. A loft, it is committed to *Talus* in manner afore sayd: that is to say the middle region towards the foze partes swellng round, hath also more forward a great cavitie to receive *Talus*, so that one receiuyng an other, the manner of Articulation is, called *Ginglymion*. Vnto notwithstanding the first part of the heele tendeth backwardes, beyng somewhat big, and round, with a head as it were in the outer side thereof: in that region neither neglectyng his proper Appendaunce, but departing wholly from the straight lync, or rectitude of *Tibia*, lest the foote, together with the legge in going, should haue bene ouer prompt to lyde backward to the no small vncertainie in goyng, and settyng the foote to the ground. The inferiour part of the heele bone, where by we tread, and go forwardes, was requisite to be somewhat broad, for the better setting of the foote. As also to be rough, and endued with a transverse Process, that thence might haue his beyng the Muscle, that serueth to bolue the fourth ioynt of the toes. Where beside springeth that Musculous matter, whence the foure Muscles proceede, which with a long tendon, be implanted to the inferne region of foure toes, and therefore by these eminent Processes is left a certaine cavitie, or hollow place, wherein more fitly might lye both that Muscle, and Mus-

culous

culous substance, lest that the foote beyng strongly set to the ground, the heades of the same Muscles might be, by too much compression, offended. Now also the heele, in that part which is sayd to go forth backwardes in fourme of a head, with a certaine flatnes, is also lightly made rough: for the more fit, and easie insertio of that tendon, of all others the greatest, and strongest, which is made by the conioynng of the iij. Muscles, moyning the foote, in one. In that part whiche is towards the little toe, this bone is ioynd with that called *Cyboides*: and so in dede the manner of his Articulation is supposed most rightly to be *Ginglymion* referred vnder *Synarthrosis*. Agayne where it respecteth the greatest finger (which part notwithstanding seemeth more rightly to be accompted the inner syde of the heele bone) it sendeth out no small Process, which is augmented by the hollow in the inner side engrauen, and for that cause was ordeyned as a proper propugnacle, both to the tendons of Muscles, as also to the Veyne, Arterie, and Nerue thereby passyng. Neither for any other consideration was that side so notably excaued and hollowed, then to giue place to these vessels, and tendons: to all which aswell this same Process is profitable, as requisite also for the fit setting of *Talus* with the heele bone. In fine, the outer side of the heele is depressed vnder a small Process: and herein resteth a Cartilaginous crust, visited by the tendon of the vij. Muscle seruyng to the extension of the foote.

The third bone, called the Shiplike, or boatelike bone, because it somewhat nearly toucheth the shape or fashion of a boate, is put next in the inside of the foote: in whole former seate is insculped a deepe cavitie, wherein the round head of *Talus* is settled, and this Articulation is put most meetely vnder *Enarthrosis*, because in it (but very obscurely) no motion is sene. The posterioir part thereof is committed to the first seate of the fist, sixt, and seuenth bones without names, and that in such sort, as it is not easie to iudge whether it receiue, or is receiued of those bones. But notwithstanding that some obscuritie must needs be graunted (here reuerence beyng added) I haue hitherto obserued the Articulation thereof with lesse obscuritie. For although the vij. bone seemeth neither to receiue, nor to be receiued, (yet rather receiued) by the (notwithstanding) not very obscurely admitted, and the fist to all mens eyes, more evidently is hollow, and excaued. And as touchyng the outer side, it is round, large, and sinuated where it is ioynd with the vij. bone: but thence (on the inside) as it departeth, it gathereth by little and little to the fashion of a corner, and inwardly endyng with a Process, like the neb of a Shippe or boate: and so prominent is the inner side, as that it maketh a notable bone, or round encreasing, by meanes wherof the right, from the left, is easely distinguished, and knowne. And thereby is the cavitie vnderneath made greater, by the goyng forth of this part thereof: wherein is fitly reflected the tendon of the vij. Muscle moyning the foote. The roughnes of this same bone is not resident in some one part onely, but abundant eche where, both aboue & beneath for the fast placing of Ligamentes, as behoued to the coniectyng & knittng together of these Bones.

The fourth is *Cyboides*, or after the Latins *Cubiforme* os, as it were squared lyke a dyce: yet it is not so, but rather made after a straunge and diuers fourme: and therefore πολυμορφον most rightly it is named, as a thyng diuersly fourmed. It sitteth in the outside of the foote, and in the foze part, is ioynd in that order with the heele bone, as it seemeth no more to receiue, then thereof to be receiued. In the posterioir part of it, there be y. as it were cavitie eident, to receiue the endes of the outer bones of *Pedimus*, thereto roted, as their ground and foundation. But to speake of the inside thereof, that is coherent with the outside of the seuenth bone, on which side, no otherwise then in eche place where it is coupled with other bones, it is lightly incrusted with a Cartilage: but in no place els: left

℞. iiii.

by

The asperitie in the head of the heele and v. use thereof.

How Talus is articulated with Cyboides.

A process and the use thereof.

Why the inside of the heele is so notably excaued.

The outside of the heele described.

The insertion of the 7. muscle extending to foote.

3.  
The bone of the foote called scaphoides, and vniuersiourly the Shiplike or boatelike bone. The situation of the boatelike bone.

The articulation of the boatelike bone with Talus by Enarthrosis. The description of the posterioir part of the boatelike bone.

Col. libid.  
The description of the outside of the boatelike bone. The description of the inner side of the boatelike bone. The reflection of the tendon of the 5. muscle moyning the foote.

The asperitie of this third bone and v. use thereof. The fourth bone called Cyboides. Cyboides is nothing lesse then square. Why Cyboides is called Polymorphon. The situation of Cyboides. The description of the posterioir part of the 4. bone. The inside of Cyboides.

The outside of Cylindric.

The cauitie yel-  
ding way to the  
tendons of the 7.  
Muscle moving  
the foote.  
The upper part of  
Cybooides.

The fourth and  
vise of inferior  
part of the foote.

The figure of the  
foote is hollow  
vnderneath and  
bunched aloft.

5.  
The description of  
the first bone of  
the foote.  
Col. 1. 1. 1.

The bones of the  
second part of the  
foote called pedum  
are comparable  
to 3 postbrachiall  
bones of the hand,  
which were 3  
therefore be heare  
for 3 more re-  
semble of speche.  
Not it well.

The articulation  
called ole-  
ole. The upper  
part of the bone  
is hollow to pro-  
tected parts  
are committed  
not contrariwise.  
Why the inferi-  
our part of the  
bone is thicker.

6.  
The description of  
the 2. bone of  
Tarsus vnnamed.  
The 2. bone com-  
pared to a wedge.

The vnnatural ar-  
ticulation of the  
6. bone.  
The situation of  
the 7. vnnamed  
bone.

Epilogue.

The substance of  
the bones of Tar-  
sus.

by ouermuch loading of the bones; their motion (whiche at all is but obscure) might be resisted. Further, the extreme side of this bone is as it were forked; 2 going forth with two Procesles, distinguished with a hollow cauitie running betwene them, stretching obliquely as a gutter after the inferiour partes of the same bone: beying the perfect way for the course of the vii. Muscle, his tendon moving the foote. The superiour part is playne, and outwardly declined, for so is the fashion of the rest of the foote; that is to say, in the middlest most elatoy, and bywardes heaued, agayne, declining by litle and litle towardes ech side, but most towardes this outside. And this manner of fourme in the foote, to be about conuered or embossed round, and beneath concaued or hollow, is not onely prouidently prouided of nature, for the stronger construction, and suer setting the foote to the earth (which is so notable, as may not be neglected,) but also that the passage of the tendons and Muscles vnderneath the foote, might be more perfect, and voyde of offence. The other bones of Tarsus, which yet remaine vnspoke of, are in number namelesse.

Of which, the first is sited in that part of the foote ouer agaynst the great toe. It is in the fore part hollowed, the rather to be ioyned with the hinder parte of the boatlike bone: but in the hinder part, maketh a seate for the first of the Postbrachiall bones of the foote, that susteineth the great toe: which part (sayth Collum- bus) is hard to be iudged, whether it be sinuated, or prominent, yet sure it is in some playne inough prominent, & receiued of the first Postbrachiall bone. Albeit this case seemeth commo to these foure last bones of Tarsus, that their cauities in the sides where they ioine, are most obscure, & lest euident of all others: committed therfore together by Glene, or at least they may seeme so: but a litle afterwarde Collum- bus most properly describeth that same end of the first Postbrachiall, to haue a double cauitie, and consequently the first bone a double tubercle. For els it were a lest, to affirme one cauitie to be vnto an other cauitie committed, or contrariwise. The upper part of this bone is very narrow, and descendeth after the inside which is broadest. And this part is after a sort Gibbus, by reason of that cauitie that is to be discerned in the outer region therof: whilest the inside in the upper part of it, falleth to the side of the vii. bone with a small kynde of cauitie: yet the inferiour part of this bone is more thicke, that more firmly it might set to the ground.

The vii. bone is iij. squared, if we marke the upper face therof: whiche as it is playne, so proffering iij. coznors. But the inferiour part therof is most narrow, and as it were edged, very properly compared to a wedge, and so the vii. bone which is next to it. But the Anterior part of this vii. bone with the boatlike bone, the hinder part (lightly prominent) with the second of the bones compared to the Postbrachiall, the inside with the outer of the vii. & the outer side with the inside of the vii. is ioyned: whiche partes neither are they frustrate of the Cartilaginous crustes. The vii. is in the middlest betwene the vii. and iij. called Cybooides, this se- meth also iij. squared: but with a head somewhat longer then the vii. The fore part resteth vpon the boatlike bone, whose shallow sinuated side admitteth the small tubercle that this sheweth forth: but the hinder part of it admitteth the iij. Postbrachiall bone: the sides are attinent to the sides of the vii. and iij. bones. Whether to of the bones of Tarsus: which are in number vii. constituting the halfe length of the foote, accompyng from the extreme poynt of the houle, and so forward (all which space may be accompted the Brachiall, or worst bones) to the bones sustei- nying the toes, answerable to the Postbrachiall bones of the hand. As touchyng their substance although they be hard, yet not altogether Solid, but yeldyng way for nourishment as behoueth such bones.

Now follow the Bones answerable to the Wacke of the hand, heretofore mentioned, beying the second part of the foote, called of the Latins Plante,

or Vestigium, as it were the footsteppe, hold, or chief gard of the pace: consistyng of fine Bones, long, and round, imitatyng the ioyntes of the fingers, the great- nes of whose extreme heades, leaue the middle partes much more light, and slender. For their begynnynge are grosse, and sinuated, where they are com- pounded with the iij. last Bones of Tarsus, in manner as before is declared. But where they meete with the first ioyntes of the Toes, they swell forth in rounded heades, like as the Postbrachiall bones of the hand where they are set to the fin- gers. The greatest of these in thicknes is the first, although in length it giueth place to the rest, that is, of all the other it is thortest, and of all others therewith the thickest: the inferiour part wherof, which is vnder the Anterior head, putteth forth a tubercle, wherewith it separateth the ii. Sesamine Ossicles there resident, whereto is inserted the seneth Muscle moving the foote. And the posterior part (thombe) runneth into the diuision of the two Sesamine Bones, wherof we speake more anon.

Then so the last bone susteinynge the litle toe, where it is coupled with Cyboi- des hath a notable Processe, going forth on the outside of the foote, whiche, aug- mentyng so the length of the same bone, maketh it comparable to the longest: which els had bene that bone that susteineth the second toe of the foote, that is, that next the great toe. The which Processe, lest it might be thought to serue for no o- ther purpose, note that to it is inserted the tendon of the vii. Muscle of the foote, as more at large in the history of Muscles is declared.

Briefly all these bones, in their fore partes, are vnted to the bones of Tarsus, as also mutually inherent one with an other, but further in their progresse they are a sinder by litle and litle deuised, becommynge more slender, for the constitu- tyng of sufficient spaces betwene them, for the more lodgyng of the Muscles ser- uing to bolue the first ioyntes of the Toes, accordingly as I also touched in the description of the Postbrachiall bones of the hand.

Appendances are appertinent both to their Anterior, and posterior partes, Grisselly conuered: but in their posterior partes the heades of these Bones are fourmed roind, which are committed accordingly, to the depe cauities of the first ioyntes of the toes. Hollow are these within, and replenished with marrow, nei- ther haue they not litle holes, by which, both sucles of Veynes & Arteries with nourishment, make entrance.

The third part of the foote, the Toes, representyng fingers, do supply: follow- yng the Postbrachiall bones. The nuber of them is xiiij. in euery toe iij. ex- cept the great toe or thombe, whiche hath onely two as is also in the hand to be obserued. For that which should be the first ioynt of the great toe (like as Galen in the Postbrachiall Bones of the hand, accompteth that to be the first ioynt of the thombe, which Collum- bus (contrariwise) affirmeth the first bone of Postbrachiall) is reckned amongst the bones of the Plante last spoken of, & that with greater per- spicuitie then in the hand: whose motion there is manifest, but here as obscure as the rest of that accompt.

And euen as the nuber of the bones of the toes in the foote, are agreable to those of the hand, so likewise they are litle different in substance, construction, and si- tuation: save that in the foote, the Anterior partes of the first ioyntes haue dou- per concauities, for the couduyng in of the greater swelled heades of the bones of the Plante, which kynde of Articulation is called Enarthrosis, but euery of their mutual Articulations, singly. The space betwene the knofs of the ioyntes in the foote, are thortest then in the hand, and round bunched aboue, but beneath hol- low, and sinuous, for the safe admittance of the tendons of Muscles seruyng to bolue the second, and thyd ioynts of the toes. As for Appendances, euery of their

The plant in  
moues, putteth the  
foet: answerable  
to the middle of  
the hand, bones  
of the hand.

Number.  
Figure.  
The description of  
the first bone of  
the foot.  
The use of the  
bone in the  
foote.  
The use of the  
bone in the  
hand.

The position of  
the bone in the  
foote.  
The description of  
the bone in the  
foote.  
The use of the  
bone in the  
foote.  
The use of the  
bone in the  
hand.

The use of the  
bone in the  
foote.  
The use of the  
bone in the  
hand.  
The use of the  
bone in the  
foote.  
The use of the  
bone in the  
hand.

3.  
The toes are the  
3. part of the foote.  
The number of  
the bones of the  
toes.  
The toes have  
3. ioyntes in the  
hand and foote.  
A Collation of  
the bones of the  
toes with the  
bones of the fin-  
gers.

Where the bones  
of the toes be Ar-  
ticulated with the  
bones of the Plante  
by Enarthrosis.  
What is Enar-  
throsis.  
The manner of Ar-  
ticulation of the  
bones of the Plante  
and toes to the  
bones of the hand.

The vertue of  
Cartilage in Artic-  
ulation.  
Why the extre-  
mities of y<sup>e</sup> toes  
haue neither ap-  
pendance nor  
Cartilage.  
Mey.

The situation and  
figure of the Ses-  
amine bones.  
The vse of the  
Sesamine bones

Their substance.  
Medullous wyce  
conferres in the  
sesaminez.  
Why they are cal-  
led sesamina.  
Why Location  
in the toes is  
sometime hard to  
be reposed.  
The number of  
the Sesamine  
bones is vncer-  
taine.  
The difference of  
y<sup>e</sup> Sesamine  
bones from the  
rest.  
Euch<sup>r</sup>, Cap. 37.  
The diucluse  
comment of Ma-  
gians.

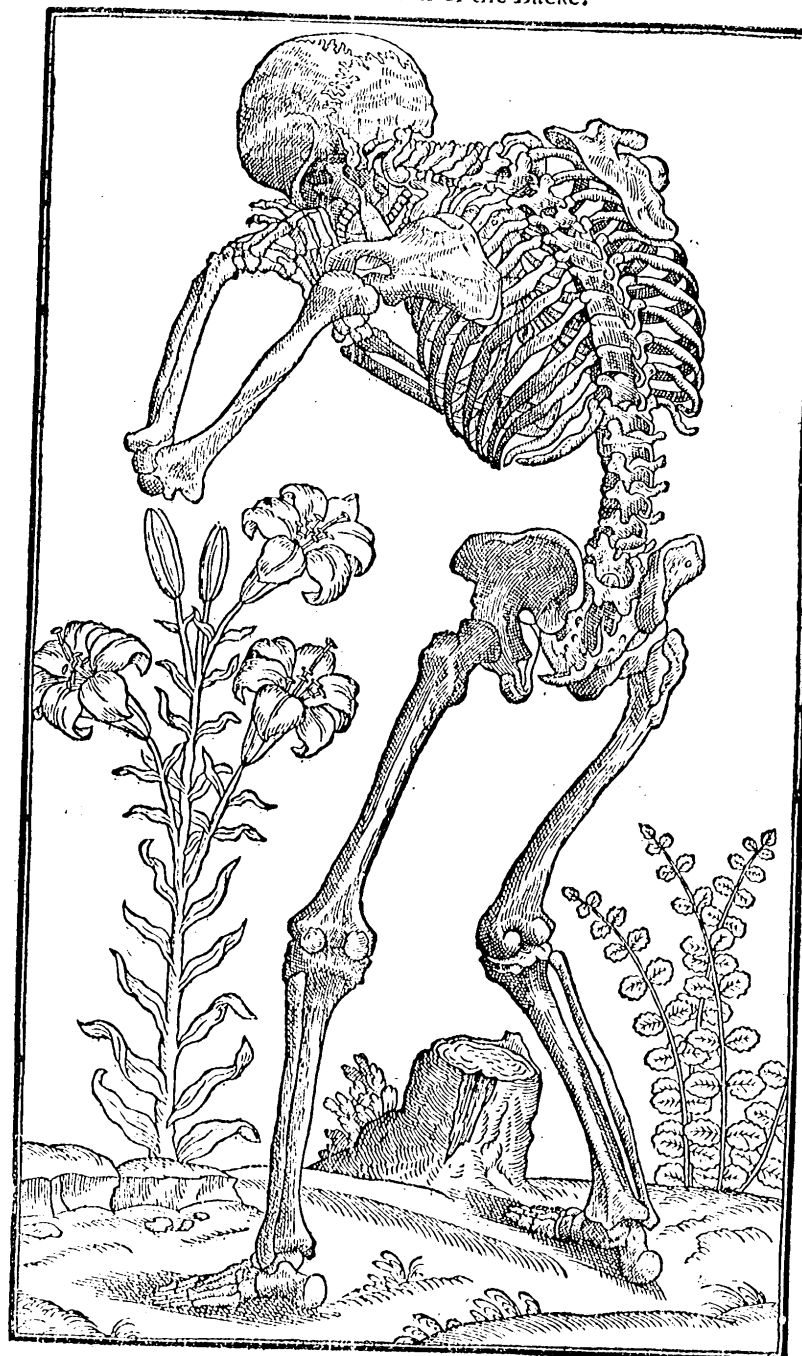
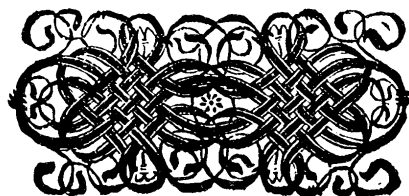
heades tast of their benefite, with the slippery cloythng of Cartilages, for Articulation, and motion sake, exceptyng the extremities of the toes: where is neither Appendance, nor Cartilaginous crust to be inuented: for that to no other Bones they are coarticulated, and knit. Their substance (inwardly) is endewd with fit cavitie, for the conseruation of Ossie nourishment, wherewith they are filled.

Thus is finished the last parte of the foote, but before I altogether cease to speake of bones, accordyng as I haue heretofore promised, the small Ossicles, or Sesamine bones shall occupy a litle space of tyme, least (peradventure) they be deemed forgotten: which crime, in this discourse, I would not be accused of. Under the ioyntes therfor: of the fingers, aswell of y<sup>e</sup> handes, as toese, are litle round bones, which although they were created of nature to fulfill the boyde places, left to those ioyntes where they growe, yet serue they to other farre greater vses: beyng no other wise, as propugnacles to the ioyntes, then the rotule of the knee for the defence of that region: not a litle also strengthnyng the ioyntes to the apprehendyng, and holdyng of any thyng, and in the foote, to the equall passing one the ground. So also, that the ioynt in bowling, should not yeld to sharpe a corner, they are in substance almost solid, yet within replete with pores, to conserue y<sup>e</sup> wyce of medullous nutriment. They are called *Sesamina Ossicula* for their litenes, and likenes to the Sesamine seede, these make sometyne the first ioyntes of the toes being lured, hard to be rightly rested, but by a skilful Artist who knoweth the reason of such difficultie. The number of them is not certaine, sometyne x. sometyne xv. and in some xx. but in aged persons more great, & notable. Inough differēt also are those ij. reposed vnder the first bone of *Planta* where it is Articulated vnto the first ioynte of the great toe, where they cleaue, and are much greater then all others, yet the inner of these excēdeth the other in largenes. Which the followers of hiddē, and Philosophicall misteries, haue affirmed subiect to no corruption: feinyng that it is kept in the earth untill the day of resurrection, when, as a seede it shall spryng, and renewe the body agayne,

So that I perceine the godly Partyes, whose bodies, for the profes-  
sion of Chyist haue bene burnt to death, shall neuer rise agayne.

for well I am assured, that what seede soeuer is once consoun-  
ded by the force of that element, the same shall no where  
after be found to take roote: Which doctrine, together  
with the Doctours, is to be shunned, and dete-  
sted of all true beleuers of Chyist, his death,  
and resurrection. But here of the descrip-  
tion of the Bodies frame worke, the  
glasse is runne and other partes  
require to be spoken of.

*An end of the Historie of Bones.*



## The second Booke of the Historie Man, discoursing the Cartilages.

The description of  
a Cartilage.  
Col. 1. lib. 2.  
Cap. 1.

It becometh not a  
cartilage to have  
fence.  
The fleshy part  
of Cartilages.

Nature marke-  
ling in creating  
the Cartilages.



Cartilage is a Substance, meane betwixt the bone and the Ligament, being so much the more softer then the Bone, by how much againe it is harder then the Ligament. In whiteness it agreeth with them both, and of sense is helplesse: for so it was requisite, whether they be placed in the office of sustaining & enclosing, or serue in steade of propugnacles: els preuent the wearing of bones by moving: or make that they cleaue together more firmly: or augment concuities: or yeld to eche action more facilitie. And so hath Nature disposed their substantiall properties, as by yelding eche where with their softness, they may not be broken, in that they resist not, as the bones, nei-

ther do they slippe away by any force, or be extended by Attraction, as doe the Ligamentes for the most part: but alway returning to them selues, are not soone displaced, nor easely chaiged in forme. But because I purpose to speake of them more particularly, as to soze I haue traueiled in the bones, it should seme superfluous to speake more of their properties, sithens to what end they were created eche one shall declare it selfe.

Wherefore to begyn with the first, it should seme most worthy that the Cartilages of the eye lyddes be no longer deferred, which are in number as many, as the very lyddes of the eyes, that is two to either eye, one aboue, which in me, and such creatures as onely moue the vpper lyddes, are greater then the neither: but in others, as byrdes, the nether excede the vppermost in quantitie.

These Cartilages are situated to the extreme borders of the eye lyddes, clothed within with a Membran, and without with skinn. Their situation thus in the extremities for great consideration was ordeyned of Nature. For more straitly by them are the eyes hable to winck and close together, profering them selues likewise as propugnacles to the eyes by the sustaining of heares vnto them. Which by their meanes are stidly supported, & not slacklyngly or losely borne: also one lineally distant from an other and forwarde tending, lightly preuenting euery iniurie offered by dust, or eche flyeng litle creature. As also that for the more firme mouing of the eye lyddes, the Muscles might be to them inserted, these Cartilages are there iustly reposed.

Next to these are those two constitutyng either eare, so annexed to the hole of hearyng, to dilate, and keepe open the same continually, to the perpetuall promptitude of hearyng eche sound and voyce. These Cartilages are made more thicke aboue, and chiefly neare the hole whence they haue their beginning, & are more hard then, bycause of their vicinitie which the temporall bone. Further, about the auditoz passage is this bone made rough, for the generation of Cartilaginous matter, which is to that place affixed, so that by no waight it may slippe down, or otherwise be drawen byward. Both within, & without they are endewed with hollow, and also Gibbous places, the prominent partes outward being respondent to the hollow cauities inward. Agayne, they are aboue round, & beneath prolonged with a litle lappe, or (as we may terme it) a fleshy Appendage: which although it deped vpo the borders of these Cartilages yet is it altogether voyde of Cartilaginous matter, neither standeth it in nede therof, since it onely dependeth, that is, is sustained, but susteineth not: for the partes that most susteine are most ströng. To who should it seme doubtfull to iudge why the eares were

The cartilages of  
the eares.

Their best.

Why they are  
thicker aboue.

Where they are  
harder and why.

Where the bone  
of the temple is  
rough and why.

The figure of the  
Cartilages of the  
eares.  
Their fleshy ap-  
pendage.  
Why the substance  
of the eares was  
not made doune.

## The second booke of the History of man.

Fol. 2.

were not formed for stiffness, rather of the substance of Bones then Cristles, sithen that substance being made subtile and thin should easely haue broken: or thicke, makinge of solid to haue combzed the head with the ponderous waight therof. Wherefore of best right their substance was light, and Cartilaginous, to be lesse endamaged by outward force. And more for comelynes, then for defence sake they are closely entwapped with a skinn, which is (excepting the borders) hard, and tough.

As to the extreme portio of the nose is made Cartilaginous by the great prouidence of nature, both to be shut, whereby to restraine & forbid the ascense of euill saours, as also agayne to open & be dilated, for the attractio of breath & ayre. Furthermore this reason of the substance of the nostrils was expedient (euen as we sayd lately of the eares) that hardly it might be hurt of outward thyngs, which is most ofte practised. For being pressed, it yeldeth but neuer breaketh, which to necessary vtilities had perished had the nostrils bene otherwise made, or of the substance of bones fabricated. Wherefore most sapiently hath the diuine artificer decreed this part, as also all other, that is, as the lower partes of the nose were made Cartilaginous, so also to be knit vnto the superiour Office partes, whercon they depend as their seate and foundation. With three Cartilages is made the extreme partes of the nose, wherof two constitute the sides called the wynges, betwene which intercedeth the third Cartilage: whereby are formed two holes in the nose: and this middle Cartilage is to the bony hedge, or diuision of the nose auisurable, and very finite. But it is onely the wynges of the nose which haue any motion, being endewed with proper Muscles, as well to plucke them outward, as inward sayth *Vesalius*: but that in no wise consenteth to *Columbus* saying: Outward they haue proper Muscles to leade them, but inward no peculiar Muscle: affirming that they are shut by the benefite of the lippe. Whose iudgement truly, if with the thyng it selfe you do conferre you shall finde it aptly consonant with veritie, if my body be like to other mens, or others like myne. But now forwarde with the Cartilages.

We recited in the former Historie in speaking of the neither iust two Cartilages, which are found betwene the superiour Proceses of the same iust, and the bones of the temples. They are moueable, and for no other cause ordeined then for the perpetuall of his action, for although the Articulation therof is with sufficient scope, & slackness: yet with oft speaking, eating, and gapping the bones must needs weare, or at least leaue of to moue by weariynes, were these not moueable Cartilages their sited, by whose benefite, when soeuer nede requireth, the iust readily moueth, neuer (almost) requirynge tyme of rest.

Now agayne, not a litle wonderynge that so many of old, and sondry of late yeres haue deceeded them selues, and erred in their wytynges, *Realdus Columbus* noteth that *Larinx* is continuall and made of the substance of Bones wholly, vnles it be the Epiglot, which sight of right to be Cristly, that it might without hurt admitte continuall mouing, whiche is caused by continuall expirynge, and inspirynge: besides that it was needefull for it also to moue, whylest we swallow any thyng or speake, there sometymes to be lifted by, and otherwhyles depressed doune, as also in vomiting contrarily pulled, which motions it easily foloweth, the Cartilage yelding on either side.

But vnder *Larinx* all *Aspera arteria* is Cartilaginous, distinguished with beery many Cristly rynges: whiche ringes (notwithstanding) are not wholly Cartilaginous: for backwardes toward the Vertebres where it glideth down by the stomache or *Esophagus*, they are intersected with a Membran, there neuer theles bindeing them together. Broken they cannot be, yet was it expedient they were so fashioned, as to geue place to *Esophagus*, least otherwise it should

Why the eares are  
Cartilaginous.  
Why the eares  
are covered with  
a hard skinn.

Why the extreme  
part of the nose  
is Cartilaginous.

Why the whole  
nose was not  
made bone.

Why the vpper  
part of the nose  
is bone.  
The extreme car-  
tilages of the nose.

Why the wynges  
onely of the nostrils  
moue.

Lib. 2. cap. 17.  
*Vesalius* in *extreme*.  
Lib. 2. cap. 3.

How the wynges  
of the nostrils  
are sited.

The Cartilages  
in the face of  
man: the use  
of the neck  
their iawe.

Their situation.

Their vse.

*Larinx* hath bene  
described as a  
thing consisting  
of Cartilages.  
Lib. 2. cap. 5.  
How *Larinx* is all  
of bones, the *Epiglot*  
excepted  
why the *Epiglot*  
ought to bee  
Cristly.

The substance of  
the ringes of *Larinx*  
the *Arteria*.

The necessary  
figure of the  
Esophagus  
& Cristly ringes.



The figure of the  
rings the mem-  
bran being taken  
away.

In Angina some-  
time y<sup>e</sup> membran  
that covereth  
these rings may  
be taken of, or to  
cut away.

The progreffe of  
Trachea Arteria,  
Of the cartilages,  
Of the vertebres,  
The first vertebre  
wanteth a carti-  
lage.

The use of the  
cartilages of the  
vertebres.

The quantitie of  
the Vertebres  
changelth the quan-  
tity of the Carti-  
lages.

The Cartilage  
under Os sacrum.  
The Cartilage  
betweene bones  
of Coccyx.  
Why in women  
theris much of a  
cartilage betweene  
the first and secon  
bone of Coccyx.  
The quantitie of  
the Cartilage in y<sup>e</sup>  
toppe of sternon.  
The diuers use of  
the Cartilage in  
the toppe of ster-  
non.

The use of the  
Cartilage in the  
middle of y<sup>e</sup> brest.

Both the true  
and false ribbes  
haue Cartilages.

The shorter  
ribbes haue longer  
Cartilages  
and contrariwise.

The figure of the  
Cartilages of the  
ribbes.

The bristles of  
the Cartilages of  
the brest.

The brest is nat-  
urally mouyng.

The mouyng of  
the brest is volun-  
tarye.

The mouyng of  
the brest is volun-  
tarye.

The use of y<sup>e</sup> false  
ribbes.

suffer compression by them in swallowing the sustenance, the which Membran if you take away wholly, the rings appeare vniopned representing the figure of this letter C. But now they are together by the inuolapping of this Membran, which, in that sharpe disease called *Angina*, may perhaps sometime be taken or cut away. The iourney of this rough Arterie endeth under the canell Bone, where it is cut into two partes or bowes, which are after separated into other two, and those agayne into others, and so at the length dispersed throughout all the substance of the lunges, to transport the ayre inspired and expired.

**N**ext, we speake of the thicke Cartilages, whereby the bodies of the Vertebres are committed together: the first excepted, which as it hath no body, neither any Cartilage. But to speake of the benefite which here these Cartilages giue: we finde that by them the Articulation and knitting together of the Vertebres is made more slacke, and easie, whereby they can bowe forward, backward, and to the sides, aptly, after the will of the creature. Their breadth is answerable to the bodies of the Vertebres, leueyng, or making euen their endes where they meete. Wherefore, as the turning ioyntes of the backe do still, in going downward, increase in quantitie: so accordingly these Cartilages are made greater and thicker, to the end they might not want wherewith to endure the greater increase, and waight of bones.

**V**nder *Os sacrum* also, where the tale bone is fastened, a Cartilage lyeth: and much of a Cartilage is put betweene the first and second bone thereof, but especially in women, because in bringyng forth the byrth, the tayle bone (as we haue declared heretofore) yeldeth backward, but in men it is neuer moued from his seate.

**S**o likewise the top of Sternon hath on each side a Cartilage, where it admitteth the knitting to of the Cannell Bones, and these also mouable according to the uses of the Cartilage of y<sup>e</sup> neither iaw before expressed, although these haue nothing so apt, and often mouynges as that hath. Notwithstanding in great crynges, and swallowing of the meate, as also to expiration and inspiration, those are much conduent, whilest the brest is some whiles drawen together, and other tymes riseth: so is the expeditious mouyng of the armes procured thereby.

**A**gayne, betwene the first, or second bone of the brest is sited a certayn Cartilage, which is soft, and usurpeth the office of a Ligament: wherby the superiour part becommeth more apt to moue.

**T**he ribbes also grow Cartilages like vnto Appendaunces, in so much as respecteth their anterior partes, aswell in the true ribbes, where they are committed to the brest bone, as in the false ribbes not adherent to the brest bone otherwise then by the Cartilages of the true ribbes. Wherefore in the ribbes this more is notable, that the shorter ribbes haue shorter Bristles, and the longer ribbes, the longer Cartilages: so to the uppermost ribbes are round Cartilages, but to the neithermost much broader. Their uses we haue almost sufficiently touched in the description of the ribbes. For according to the mouyng of the lunges they make the ribbes to yeld: sithens it behoueth the brest to be often lifted by, & often depressed. Which mouyng although it be naturall, yet should it not be so free, if all the ribbes were of the substance of bones: neither might nature long endure the voluntary mouynges of the brest, which are requisite in putting forth y<sup>e</sup> boyce, but that the Cartilages minister an ease to the laborious dilatation of the brest. Besides this, the false ribbes yeld an excellent effect vnto the body, and not to be neglected, in giuing scope vnto the Ventricle when it swelleth by repletion. Which gift is not small, since all do know what great incommunities to the body, compression at that instant might inferre.

The

**T**he brest bone, called also Sternon, in the neither part thereof hath a Cartilage of a triangular forme, although sometimes foure square, and in others clouen in two. Some therefore haue called it a little sword, others the shieldlike Cartilage, others *Mucronatum*, that is to say, sharpe pointed or edged, the Arabians, *Mulum Granatum*, the Grecians *Zepeidh*. But what soeuer name it meriteth, yet nature made it not to that end, as it is commonly iudged: that is to say, for a defence, & propugnacle to y<sup>e</sup> mouth of the Ventricle, which farre distant fro this, lyeth in the left side. But more rightly they might iudge, that it guardeth the hart, & defendeth *Septum transversum*, whose tendon is knit thereto. Wherefore it happeneth, that a wounde in this place is dangerous, and deadly: for because nature placed there this Cartilage, as a shield vnto it. Which groweth so fast vnto the lower part of y<sup>e</sup> brest bone, that without great force it may not be plucked away. Wherefore they are worthy derision that suppose it to slippe fro y<sup>e</sup> seate sometime.

**I**n the head of the shoulder blade, or scaple bone is an hollow or cōcaue sometime. Where to is annexed a Cartilage for the augmentation thereof: for in that part (els) the compass of the shoulder blade could not haue sufficed to depe a hollow as might haue bene sufficient to the receiving of the head of the shoulder. Nature therefore for the augmentation thereof deuised a Cartilage wherewith to continue a deeper profunditie, which also so artificially is wrought, as that the same ioynt by the mobilitie of this Cartilage is made more agile, easie, and active: and by the altitude and depth of the same cauitie, at no tyme is easely displaced. Which, when it happeneth, is not without great diligence repaired.

**T**he like Cartilage we finde in the cauitie of the hippe, which admitteth the long, and rounde head of the thigh bone. But that is not made there any thing moueable, but onely to that end prepared, that the borders of the same cōcauitie might more highly be augmented, and so the profunditie be made greater: because the huckle bone els might not be so deeply excavated, as should seeme sufficient to admit the longitude of the head of the thighe.

**F**urthermore from y<sup>e</sup> lower heades of y<sup>e</sup> thigh, to the upper regio of the legge, are two Cartilages like halfe circles, the one on the inside, the other on y<sup>e</sup> out side. I can easely compare their figure to the fashion of a sickle, thicker on the out side and thinner on the inside, and inwardly ending at that tubercle, which in the middle upper face or end of the legge riseth, where they are ioynted together. And they are made to encrease the cauities there in the toppe of the legge excelped: wherein more fitly are inserted the lower heades of the thighe, neither that the moving of the ioynt should be hindered.

**T**o come vnto the wrist of the hand, neare to the poynted Proesse extended from the extreme head of the cubite, which Galen in dayne beletted to be knit to the fourth bone of the wrist, is a Cartilage put, which fulfilleth the same place beyng otherwise voyde and empty: presentyng likewise, lest that part of the hand, whilest it is bowed to that side, should strike vpon that sharpe Proesse to the great greuaunce, and hurt thereof.

**M**oreouer, betwene the bones of *Pubis* cleaueth strongly a notable Cartilage, which in the superiour part is broad, and thicke, but going downe: wardes, decapeth by litle and litle, ending at a sharpe, in that place committyn together those bones, like most hard and cleauyng glew, so fast in deede hollyng them together, as that more rightly growyng, then ioynting together they may be termed. And for that cause in the former treatise, we haue reproued the opinions of such, as are not ashamed to affirme these bones to open in the tyme of child bearyng, whilest with a knife, without great labour (as oft hath bene asserted) they utterly refuse to be separated.

P. liij.

Also

The figure of the  
Cartilage in the  
lower part of the  
brest.

The names of  
this Cartilage.  
The use of *Mucro-*  
*nata* Cartilago  
after the popular  
iudgement.

The true use of  
the cartilago *trans-*  
*uersum*.

Why a wound  
received in micro-  
*nata* Cartilago is  
deadly.

*Mucronata* carti-  
lago slippeth not  
from the brest as  
some suppose.

The Cartilage in  
the head of the  
shoulder blade  
and use thereof.

The shoulder is  
freelye moued.  
The Ligament of  
the shoulder hath  
difficillie return-  
tion.

The Cartilage in  
the Concauitie of  
the hippe is not  
mouable.

The use of y<sup>e</sup> car-  
tilage in the con-  
cauitie of y<sup>e</sup> hippe

Two Cartilages  
in the interio-  
re heues of y<sup>e</sup> thigh

Their uses.

The Cartilage in  
the wrist of the  
hand.

The use thereof.

The substance  
and figure of the  
cartilage between  
*Os Pubis*.

The use thereof.  
*Os Pubis* seeme  
rather to grow  
together then to  
tyme together.  
That the bones  
of *pubis* doe open  
in child bearyng  
is false.



## The second Booke of the

Why the bones  
in the ioyntes  
are inclosed with  
Cartilages.

Why in the Car-  
tilages of the  
ioyntes there is  
a certain thickness.  
There is supposed  
the most place to  
be the napples.  
The substance of  
the napples.  
The difference  
between the napples  
and Cartilages.  
The use of the  
napples.  
The napples can  
bend but not  
bryake.

What is a nappa.  
The napples are  
bath in a notable  
meane.  
The manifications  
of the nappa.

Why the napples  
are of round figure.  
The napples doe  
grow alwaye  
whilst the body  
enlargeth.  
In what order  
the napples doe  
grow.  
Cap. 38.

The new part of  
the nappa that grow-  
eth thickest for-  
ward the olde.

Cap. 39.  
The originall of  
the napples.

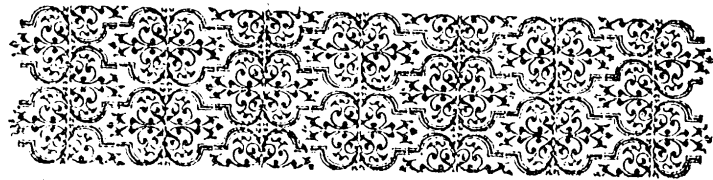
Why under the  
napples is such ex-  
quisite sense.

As to there are Cartilages best closed on euery ioint, whether the metie there of be obscure, or manifest. For in the ioyntes it becometh the bones to be encrusted with such Cartilages as be light, and slippery, for the easie prouoking of motion: and that by naturall construction they be not soone. Therefore you finde alway added unto them a certaine moyst matter, wherewith, as with a certaine fatnes the ioyntes are continually nointed.

As to this I hold fully sufficient for the declaratiō of Cartilages through out the body. Notwithstanding it is best determined in this place to speake somewhat of the napples, before I make an end. Whiche, although it be truly sayd that their substance is meane betwixt bones and Cartilages, being neither so hard as bones, nor so soft as Cartilages, from which in colour also they differ much: yet we haue ioyned them vnto the treatise of Cartilages, as more appropiate to the nature of them. They of right defend the most soft partes, the endes of the fingers, lest they be lightly hurt by euery outward occasiō. Therefore their hardnes establisheth firmly the endes of the fingers, and to the apprehending of harder thynges, are approued most necessary, so made to bow and giue place, but not to bryake. Likewise nature (sayth Galen) was circumspect, that in making them hard they should neither lose the vilitie for which they were made, nor they them selues suffer any thyng easely: accordyng to her custome, in making in ech creature euery prominent particle of such substance, as that neither for softnes they may be crushed, nor yet for dyntes broken. Likewise for securitie sake the napples are of rounde figure. For of all other figures the rounde offereth lest aduantage whereby to be hurt, because it hath no corner standyng forth of power to be broken. But because by stretchyng, and euery other action of the napples, their extremities must needs be woyn, to their growyng was annexed perpetuitie, although the whole body els be diuied to the defect of growthe. But how? Sayth *Euchysius*, they grow not as other members together both in breadth, length, and thickenes, but onely in length: the new (sayth Galen) cuer dryuyng forward, and thrustyng out the old. So that euery in place of that, whiche in the extremities of the napples is dayly woyn, new cometh forward, and supplieth the rowme.

*Reildus Columbus* proueth the originall begynnyng of the napples to come from the skynne, and the tendons extending the Muscles of the fingers, although under the napples the tendons are caried to the extremities of the fingers: for beare they are afterwarde dilated, as shall seme likely to ech sounde iudgement, sithens under the napples lurketh such exquisite sense.

¶ *An end of the History of Cartilages.*



## Of the History of Man, the third Booke, of Ligamentes.

Fe. 41.



As to the ioyntes of the bones, and Cartilages by Ligamentes bene compact & bound together, nothing might haue prohibited the bones, and Cartilages by euery motion to be loosed, and fro their naturall seate one from an other remoued. Whiche that it might not come to passe, the trea- to of all thyngs commaunded that all the ioyntes of the bones, and Cartilages, should be clothed about with Ligamentes: by whose benefite, the bones might safely be bound together, & in their ioyntes contained: neither readyly by euery violent motion to be broke one from an other. For, that their substance by the strong force thereof

denyeth. And agayne by their hardnes, go free from receiuyng hurt by the continuall, and incessant motions that be vied.

But to begyn at the interpretation of the name: A Ligament is called of the Grekes *συνδσμος*, the Latins *Vinculum*, which we translate a Bond. It is in substance, hard, white, and of sense, and hollownes voyde, yet not so hard as the Cartilage is. The begynnyng therof is at the bone, and the end thereof is at the bone, except a certaine, which more particularly shall be touched in their places.

A Ligament is made to hynde together our members, and therefore chooseth the name of a bonde, and without them our partes were lost, and might not moue. For although their substance seemeth sinewy, yet (as I sayd before) it is altogether voyde of sense euen as the bone, and Cartilage: in which poynte, with wonderfull prayse the prouidence of nature is to be extolled. For if the Ligamentes had bene endued with sense, what paynes should we labour in at euery motion of the bones?

Beside, the Ligamentes are made for the production of Muscles, as somewhat before we haue noted where we entreated of the vse of Appendances.

Agayne if you marke, you shall finde euery Ligament so hard, as that it hath the might strongly to bynde: so as neither the ioynte may be broken, neither the mouyng of it (in so much as appertaineth to the profitable vse thereof) thereby hindered. And this is the first & chief vse of the Ligament (sayth *Vesalius*). All, which belongeth to their second vse, is that they in their proper places confine the tendons, lest they from their states decline, or be eleuated in their action.

They are nourished notwithstanding by a thynne medullous matter. Wherfore, betwene the bone and the Appendance nature placed the Ligament, to the end they might more aptly draw their nourishment to them.

And although the situation of all the Ligamentes is almost after one kynde of order, yet much in them selues do they differ. For of them, some are thicke, some slender, others great, some small, some broad, some narrow, some roūd, and some not round: and other differences diuers of them chose, as more expressly shall be declared in their particuler explications. Whiche that it may be done in order we will begin at the Ligamentes of the head, which is the principall part, all philosophicall opinions notwithstanding.

From the bones of the head & upper iaw, betwene the seamces & commissures, springeth Ligamentes thynne and broad: which, beside that they bynd together these bones with a most strong tyng, are made for the originall of those Muscles, which from those partes haue their begynnynges. As be the Muscles of the face,

Vesalius lib. 2. Cap. 41.

Why nature created Ligamentes to be voyde.

Colum. lib. 3. Cap. 1.

The name of a Ligament.  
The substance of a Ligament.  
The situation of the Ligament.  
The vse of the Ligament.

Why the Ligament wanteth sense.

2.

3.

The second vse of the Ligamentes after *Vesalius*.

The nourishment of Ligamentes.

The difference of Ligamentes.

The head is the pynce of all other partes wherfore the philosopher saith.

The Ligamentes of the head.  
Situations of the head.

p. i.

face,

The articulation  
of the head with  
the Vertebres is  
most noble.

Why the Liga-  
mentes of the  
head with the  
Vertebres are  
most strong.  
Ligament of the  
head is deably.  
The heades of  
those that be han-  
ged are not Luxa-  
ted according to  
the common opi-  
nion.

The first Verte-  
bre sooner be-  
come then is Luxa-  
ted.

The originall of  
this Ligament.  
Why the hinder  
part of the head  
of the child in  
children in many  
partes.

Figure.  
The new place of  
this Ligament.  
The Ligament  
knitte to the toth  
of the Terdo Ver-  
tebre.  
The thyrd Liga-  
ment.  
The use of the  
Ligament.

Why he entre-  
teth not of every  
Ligament.

He determineth  
of such as in some  
thing differ from  
others.  
Galen in error.

Lib. 1. Cap. 2.

The new use of  
the Membran in  
the hole of the  
Vertebres.

face, neither talve, and eyes, all whiche arise from the seames of Commisures. And because the Articulation of the head with the Vertebres is more excellent, & of greater value then the rest, diuine nature & mother of humane seed, hath shewed therein more care, & greater diligence then in all others. For, when so great waight as is the head must needs be knit into so smal bones, as be the Vertebres, or rather if it be lawful thus to say: when nature compacted the frame worke of bones, and in comparing the head with his seate, founde, in respect of the waight of the head, the Spondils of the necke to be very small, determined to mende the misse by Processe fit for tynges, & annexing to the cauities of the bones stronger Ligamentes, then in all other partes of the body. And sithes this Articulation might suffer in no wise to be Luxated (because euery Luxation of the head is deably) it was provided that these Ligamentes should so strictly, and faithfully coeine, and hold together those partes, as that Luxation there should be most difficult. Although it be supposed among the common sort, that the heades of such as be hanged hauing a great impressed circle left in the necke, are Luxated. Others say their neckes are broken. Which to be true eche one that laboriously shall dissect, or willingly see Anatomy, shall deny. For of such inuincible force is this Ligament, as that the first and second Vertebre (to which the head by it is bound) shall more easily at any tyme breake, then be Luxated.

From the foundation of the hinder part of the head riseth this Ligament, which that it might be the better nourished and more firmly stand, Nature maketh the hinder part of the head in children with many partes and diuisions, to be hereto the better stay. This bone is round compassing, and downewardes descendyng betwene the first and the second Vertebre, not fastened, as some haue supposed, but euery where, and round about them most strongly cleauyng, so that to separate the same in dead bodies them selues, is a thyng most difficult. For it cleaueth to those bones both before, behynd, and on eche side.

Whence this Ligament hetherto described, there is an other also sufficient strong and hable, which firmly is knit unto the toth of the second Vertebre.

Agayne, besides that, there is a thyrd, which springyng from the inner part of the first Vertebre, containeth fast the toth of the second (the which toth is mentioned before in the treatise of bones) beyng round: but the sides thereof by marvellous arte so made, as that the toth, when the head is much inclined, can by no meanes hurt the Spinall marey, which that way passeth. And in this sort are the Ligamentes seruyng to the actions of the head.

But because we should offend in to much prolixitie, if all the Ligamentes of euery ioynte we should particularly describe, we therefore comprehend all them of the head together, and those especially which differ no otherwise among them selues then in greatnes or litlenes. And for that cause, we will walke in silence forwarde with the neither talve, whose Ligamentes els should be spoken of after those of the head. Of others therefore we will speake, that by some meanes do vary from the rest.

And for because Galen writeth in his booke of Bones, that the Vertebres are not conioyned in the middelt with any proper Ligament, but by the thyrd tunicle onely, which enuoyappeth the Spinall marey, and (sayth he) is caried in the middelt betwene the Vertebres, to connect and knit them together: Columbus accompteth it but worthy to be the sentence of so worthy a writer: For by what meanes (sayth he) could it seme vnto hym that the Vertebres, beyng no litle bones could be holden together, of so slender a Membran as that, which is in the hole of the Vertebre where the Spinall marey runneth. But the true use of that Membran is to preuent the Spinall marey, which, by to nye beyng to the bones, might be hurt easily, by the which great incommoditie might ensue. It is ther-

fore

fore notable, that all the Vertebres (onely the two first excepted) are enbowed both aboue, and beneath with Appendaunces, as we somewhat remembered heretofore: out of which riseth strong Ligamentes, bindyng together the Vertebres among them selues, and deteynyng the Cartilage in the middelt betwene the Vertebres. And it beloued them to be sufficiently strong, considering the great waight whiche the Vertebres must beare, and the strong motions whiche they ought to resist.

After this order these Ligamentes are deduced, that is to say, from the inferior part of the second Vertebre even to the extreme end of the tayle, about whose body these are tied.

Furthermore, from their transuerse Processe others also are produced, for the tynging to of Ribbes and Muscles.

Others issue out agayne from the hinder part of the Spondilles, both to connect the Vertebres, and also to giue beginnyng, to some Muscles.

Now to leaue these sufficiently spoken of, it shall not seme vnderly to prosecute and goe forward with the Ligamentes of the tongue, and Hyoides. For betwene the bones constituting Hyoides, passe Ligamentes for the construction of the toung. Two are brought from the two greater Processe, with which it is knit to the toppe of the toung. Other two goe forth from the stiller med Processe of Hyoides, holdyng it so up as if it were hanged in two chaynes: lyke as Distographers write the great Tomb of Mahomet, to be suspended in the ayre by the attractive force of the Adamante. Lastly there is under the toung a Ligament, which in many children that we call tongue tyed, cleaueth to sondry places towardes the fore teeth, not sufferyng the tongue to be by, nor the lippes to goe out, and not beyng cut shall corrupt the speache, the child hauing power to make distinction of wordes.

Next, for because the Brachiall Ligament, or that of the wrist is diuers from those of other ioyntes, we will speake thereof particularly. The Ligament therefore seruyng to the wrist of the arme, beginneth at the inferior Appendaunce of Radius, & Cubitus, whose office seemeth to be lyke as of other ioyntes, to bynde together the two distinct orders of Brachiall bones, left in euery motion they slippe out from their seates.

Prudent Nature therefore prepared a Ligament sufficiently strong, whiche to byndeth together these Osicles, as that they are alway ready to the executyng, and fourmyng eche proper motion: but at length is implanted to the Appendaunce of the Postbrachiall bone, and serueth to the articulation of the wrist.

In this same region are also other Ligamentes, not seruyng to the Articulation of Bones, but onely to containe those tendons whiche serue both to the fingers, and extreme part of the hand, least whilst the fingers moue they should suddenly slide to this place or that place.

In the inside of the wrist, is a forcible Ligament, and that ouerthwartly lieng, which containeth the tendons of the fourth, fifth, and sixt Muscles bowyng the fingers. Purtherleste on the outsyde there be five Ligamentes euident, containing in like sort the Muscles extending the fingers.

Among other thynges it is notable to be marked, how all these Ligamentes at the first sight seme to be but one. Albeit if we diligently follow the tendons, five transuerse Ligamentes beginnyng at the two aforesayd Appendaunces, come playnly to our sight.

But now we are comen to this place, it shall not be amisse to entreate of those Ligamentes which containe the tendons after the longitude of the fingers. It is therefore to be noted, that in the inner sides of the bones of the fingers, and after their longitude are lodged Ligamentes reachyng even unto the extremities

of.

fingers

All the vertebres  
have the 11. with  
some appendaunces.

Out of these appen-  
daunces tyng  
the Ligamentes  
of the Vertebres.  
By the the Liga-  
mentes of the  
Vertebres are  
stronge.

The direction of  
these Ligamentes.  
The use of these  
Ligamentes to  
tye transuerse  
processes.

Two Ligamentes  
to ty the toppe of the  
tongue.

Two Ligamentes  
from the toppe  
of the Hyoides,  
that suspend the  
bone Hyoides.  
The arte of Aqua  
benedicti.

The ligament  
bindeth the tongue.

How children be-  
come tongue tyed.

Of the Ligament  
of the wrist.  
The use of this  
Ligament.

The use thereof.

The insertion of  
the Ligament of  
the wrist.

The Ligamentes  
of the tendons of  
the fingers and  
extreme part of  
the hand.

The use of the Li-  
gament on the in-  
side of the wrist.  
These five Li-  
gamentes seme as  
though they were  
but one.

Of the Ligamentes  
containing the  
tendons after the  
longitude of the  
fingers.

ties of the tendons: which nature there hath prudently placed, lest in their bow-  
ynges the tendons might be lifted from their places.

**I**n the knittyn together of the thighe with the bone of *Coxendix, Ilium*, and *Pubis*, beside that Membraneous bond, but thicke, whiche is common to all ioyntes, there is a round Ligament, whiche rising from the depth of that great concavitie, or acetabulum, so largely grauen out of the aserayd Bones, is inserted to the head of the thighe: beyng of such strength, as that oft tymes it is broken whilest that part is Luxated, and so, that although the bone be restored to his wonted place, yet beyng displaced the party is alway lamed: because this Ligament still hindreth the knittyn together of the bones.

Also betwene the inferiour heades of the thighe, and the toppe of the legge in the inner part of the knee, is a thicke Ligament rising from their Appendances, and ending in the legge, made for the holdyn together of those partes. For, there being in the body no greater ioynt then these two last recited, no marvail that nature addeth to them such Ligamentes, as to no other, save onely betwene the head and the two first vertebres.

Besides the thyrd Ligament, there is yet an other, which almost compasseth about the Articulation of the knee, and here and there wappeth about the ioynt, of the which it is onely deteined. If any thinke such a round Ligament (as hath bene before mentioned) is fastned so betwene the head of the shoulber and the scaple bone, he is much deceived.

But to speake more of Ligamentes, let vs yet goe further, whilest we finde apte cause, and commodious occasion. Therefore betwene *Os sacrum* and *Coxendix* is a Ligament, not so much rounde, but riseth from the extreme part of *Os sacrum*, and endeth ouerthwartly at the sharpe part of *Coxendix*. It gathereth together these bones, and therefore is made to deteine them, beyng knit together: although it may be put to other vse, as preparing passage to the great Arterie which in man is founde.

**I**n the setting to of the foote, betwene the same, and the two bones of the legge *Tibia*, and *Fibula*, beside the bonde whiche is common to all ioyntes, there are six other to be discerned, such as in the outside of the wiest were lately spoken of. Their uses are these, to contayne those tendons which serue to the extreme foote and toes: which tendons, if these were not here placed, would for every small occasion be peruerced from their seates and places.

**T**here lye also vnder the toes of the foote Ligamentes, euen as in the fingers of the hand, made to containe those tendons in their offices whiche bowe the toes, that is to say, the second and thyrd ioynte.

**A**ll ioyntes there is one common Ligament, and that hath his beginning from one bone, that is to say from one Appendaunce, and endeth in another. These amplet and intwappe them rounde: so haue they others more slacke, and others agayne more straight, accordyng to the greatnes and litlenes of the Bones. Therefore esteeme that I speake in this place generally of all the Ligamentes, what soeuer they be, that bynde the brest, scapples, Cannell bones, nether iawe, shoulber, cubite, fingers, the small bone of the legge called *Fibula*, that part of the foote called *Tarsus*, whiche (as appeareth before in the History of bones) may be compared to *Brachiale*, and therefore esteemed for nomination sake as the wiest of the foote, and the bones of *Pedum*, answerable to the *Post-brachials*. But if you enquire of the Ligamentes of *Ilium*, and *Pubis*, I will answer, that they differ from others in nothing but mouyng.

**B**etwene *Cubitus* and *Radius*, and so betwene *Tibia* and *Fibula* after their longitude, is a Membraneous Ligament, sited betwene those spaces. Whose vtilitie is not onely to unite, and bynde those Bones together, but also lyke an

hedge, deuidyng the inferiour from the exterior Muscles. After which sorte are the Ligamentes set in the holes of *Pubis*, to distinguish the ninth from the tenth Muscle.

**T**he Luer is coneyned with two principall Ligamentes, whercof the one is toward the right part, the other toward the left, the left beyng thicker then the right. These knit the liuer to *Septum transversum*, lest downward it should be forced to fall by the waight therof. The right of these two Ligamentes is called a Suspendorie, but the left hath no proper name.

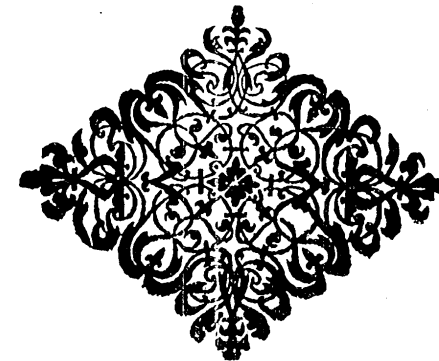
Now that I haue waded thus farre in the description of the Ligamentes, touching such particularly as differ in proportion notably, and comprehendyn the common sort in briefer order, I will here end, omittyn to speake of *Mediastinum*, *Pleura*, *Pericardion* and *Peritonium*, (although they might seme worthy to be spoken of among the Ligamentes) because els where findyng fitter occasion to touch them in appoyching so neare, whilest other partes are shewed, I haue largely ynowge reuealed their properties. Whiche notwithstanding are no Ligamentes worthely to be called, but Membrans, hauyn perfect sense, whiche Ligamentes neuer possessed. Although amongst all other, the Ligamentes of the Luer are not altogether of sense frustrate.

Hereafter be attentue how the members are moued by Muscles.

*An end of the History of Ligamentes.*

And

The



To all ioyntes a  
certaine membra-  
neous bond is  
common.  
The round Liga-  
ment seemyn to  
the Articulation  
of the hyppes.  
The rising of it,  
the infection.  
This Ligament  
in the Location  
of the hyppes may  
be broken.  
Why through in-  
fection of the hyppes  
the patient is af-  
fected.  
The ioyntes in  
the thigh are great-  
er and more there-  
fore greater Liga-  
mentes then all  
others in the body  
sitting the head.  
The Ligament  
compassing the  
Knee or the knee.  
Betwene the scaple  
bone and shoulber  
is no round Liga-  
ment.  
The Ligament  
betwene the Sacrum  
and Coxendix.  
The rising.  
Infection.  
Idols.

Of Ligamentes  
in the foote an-  
swerable in pro-  
portion to the vi.  
in the wiest of the  
hand.  
Their vse.

The vse of the  
Ligamentes vnder  
the toes.

What is common  
to all ioyntes.

The numeration  
of certain partes  
endowed with Li-  
gamentes.  
The Ligamentes  
of the hand and Pubis  
how they differ  
from others.

Of the Ligament  
betwene Cubitus  
& Radius and Ti-  
bia and Fibula.

The vse of this  
Membraneous  
Ligament.

The vtilitie of the  
Ligament in the  
holes of Pubis.

Of the Ligamentes  
of the liuer.  
Situation.  
Idols.

The Ligament  
named a suspend-  
orie.

Mediastinum, Pleura  
Pericardium, and  
Peritonium are  
Membrans, not  
Ligamentes.

The Ligamentes  
of the liuer are not  
wholly destitute of  
sense.



Of the History of man, the fourth Booke. Fol. 44.  
Of Muscles to euery member.



Muscle which the Grecians call *μῦς*, the Latins *Musculus*, is an instrumentall part of the body, and in deede the instrument of volūtary mouing, without which, no part of our body could moue at our will and desire. When Nature therfore had contrived the frame worke of the body, with the Cartilages, and swathed them euery one in Ligamentall bondes, according as to euery part she called delue, it followed then necessarily, that some instrument were deuised whereby those partes should be drawne mutually one to another according vnto the will of the creature. In consideration of whiche necessities, nature easily did foresee, that onely by Ligamentes she

myght not vse voluntary motion, because they were neither with sence nor mouing endewed, not being continually with the vertue of the animall power: neither yet of *serues* onely actiō might be made, since they haue not the force, thorough their softnes, and tenuitie, to draw, and vse so great a swaight as behoued. Wherfore she deuised at length, of both to make an instrument of mouing, which might be in conclusion harder then the *serue*, and softer then the Ligament: therewith also to participate of sence lesse then the *serue*, but more then the Ligament. So that of the Ligament the Muscle hath his strength, and of the *serue* whereby to feele and moue. *Columbus* to this purpose hath these wordes.

A Muscle (sayth he) is construct & made of Fibrous flesh, Ligaments, Nerues, Veynes, Arteries, & *Mēbrās*. With flesh that the body therof might be large, or to confirme & hold together those partes as sayth *Fernelius*: w<sup>th</sup> Nerues, that it might cary with it the moitiue vertue that springeth frō the brayne: with the Ligamēt, that in mouing it might be the stronger: with the Veayne, to be nourished: with the Arterie to possesse vital caliditie: and the Membran entwappeth, and holdeth all these together, seuering also one Muscle from another.

So, some suppose it to be called a Muscle after the likenes that it sheweth of a Mouse, whose head is small, the bellye broad, and tayle long and narrow: others likewise imaginynge of the likenes of the litle beast called a *Laserte*, doe nominate the Muscle *Lasertus*. Diuers do agayne thinke it liker a Fish, and therfore call them litle Fishes. But truely none of these fourmes are to be founde in all muscles. For some are broad, some thre square, some foure square, others round compassed, many thicke, diuers slender and small, certaine of them short, and sondry long: here, some containynge one manner of Fibres: there, others mixt with all kyndes: in this place, some are endued with two kyndes of Fibres: and in that place many are interwoven with thre. Thus beyng diuersly fourmed, & diuersly composed, there is no certaine comparison to be made vnto them, according vnto the likenes of any thing, but if it represent one, it is diuers frō others, and shewynge the shape of some perfectly, & is reposed of others immediately.

The endes of Muscles are in tendons, or as we commonly say, chozdes: yet not all, for you shall see many without the. Contrariwise some Muscles haue tendons in their begynnings, & some in the middelt: although Galen maketh mentiō of the fourth Muscle onely that openeth the neither iaw, wheras takynge occasiō to speake therof, he geueth great prayles, & commendatiōs vnto Nature: but he might also haue embayzed (sayth *Columbus*) the fourth Muscle, which draweth *Hyoides* downewardec, and receiveth his tendon of Nature in the middelt.

What a Muscle is and p<sup>r</sup> description thereof. Vesal, Lib. 2. Cap. 1.

The marvellous workmanship of nature and toyce sight.

Why voluntary motion could not be by Ligaments why not by *serues*.

What instrument at length was contrived vpon.

The Muscle hath lesse sence then the *serue* and more then the Ligament. Which do constitute the Muscle, and the effectes of those partes in the Muscle. Fer, Lib. 2. Cap. 2. Vesal, Lib. 2. Cap. 2.

Whence it is called a Muscle after the opinion of some.

The fourmes of Muscles are diuers.

Muscles ende at tendons, but not all.

What Muscles receiue their tendon in the middelt.

The number of tendons to Muscles.  
The figures of tendons.

The rising and insertion of Muscles.

The perforation of tendons.

What is a tendon.

The difference betwene the Muscles and Perues.

A Muscle is the organ of voluntary motion.  
Whence Muscles receive their motion.

Aristotle much err'd in the practice of mans body.

Perues to be disseminated into the substance of Muscles.  
Lib. 2. Cap. 3.

The error of Vesalius in the distribution of Perues through the muscles.

Columbus against Vesalius.

What part is called the face.

There are yet some Muscles which haue but onely one tendō, others ij. some iij. or iiij. or moe. As the long Muscle of the backe, and the fist of the breast. Some haue long and round tendons, some haue roūd but shorter tendons, others haue tendons both long and broad: others likewise broad and short: so that many, and sondry are the differences of Muscles, as lately I sayd, and moze aptly shall appere in the peculiar History.

Moreouer Muscles, although commonly they haue their begynnynge from the Bones, and also end at Bones, yet not all of them obserue that rule: for some spynge from Cartilages, others from Membranes, haueing their begynnynge, and haue likewise descent in Membranes euen so to haue their endynge: diuers after their exorture descend: diuers so contrarily ascend: many are sited ouerthwartly, and many in crooked, or oblique sort are placed. Neither do the Muscles obserue one rite or order in their exorture or begynnynge, but some long, some short, some slender, some thicke: some tendinous, some fleshy: and some shewing the tendons mixt with flesh. Agayne of the tendons of Muscles, some be perforated, some not, others with one hole, many with moe.

But heare perhaps, so oft namynge this word Tendon some will be desirous to know what a tendon is, which I haue no where hetherto declared. Note therefore that a tendon is the white part in the Muscle beynge hard, thicke, and shynnyng: and newly discovered, draweth the beholders into admiration of the sayre and pleasant soure thereof. And although a tendon be endued which much sense, as dayly experience approueth vnto vs, yet is it not the same matter as is a Perue, but differeth much: for although the Perue be white, yet is it nothyng so hard as the tendon but rounder, and not so shynnyng, and beynge cut, the body is endued with many stringes, and clothed with a Membran: as also beynge cut, as lately we sayd, is the organ of voluntary motion brought vnto them by the benefite of Perues, and this power is geuen vnto the Perues from the brayne: which is the fountaine of feeling and mouing, as thoroughly in this our History of mans body is alleged, and approued: Although that renowned Peripatetician Aristotle (who in Anatomicall assertions wandred wide) sayth in his booke *De somno & vigilia*, that the hart is author of feeling and mouing in euery creature: which is as certayne as that the hart is the fountaine of blood also.

But to retorne agayne, it is most necessary that euery Muscle in consideration of his office haue a Perue, although that a small one, and some tyme Perues. And here note, that when we describe a Perue caried to a Muscle, we meane not that it is brought neare vnto the Muscle, neither yet to passe straight through the middle of it, but such Perues vnderstand to be disseminated, and soderen through such Muscles substance. Wherefore in that *Vesalius* would needs affirme, that there were some Muscles destitute both of the Veyne, Arterie, and Perue, & namely the foure square Muscle nigh the wryest, which maneth *Radix* directly downward, to know no otherwise at all, *Columbus* not vntoorthely reproo- ueth him (in his judgement) as one, that haueing slender skill in this, resisteth reason: for (sayth he) I am certayne, that in this Muscle is a Perue as euident, and perspicuous as in any other, and not difficult at all to be found. The like also he willett to censure of that Muscle which maketh the broad tendon and of others that *Vesalius* excepteth. Wherein he seemed rather willyng to deride Nature, then to open his owne no obscure negligence.

But to prosecute the particular treatise of Muscles, and to speake of them orderly, let us begin with the face: which is ment that whole space betwene the heare of the head and the chinne.

It is declared in the papper place how the fleshy Membra Tubed under the skinne

skinne through out the body, is somewhere encreased with fleshy Fibres, and de- generateth as it were into a Musculous substance, all which is now to be ap- proued and verified in the skinne of the forehead, which to be endued with vo- luntary mouing who doubteth to be needfull. For the eyes open largely by drawynge vpward the browes, and that when the partie at one instant desireth to see many thynges, and do that agayne by the constrainynge and bindynge together of all the partes circumiacent. So both those vses therfore nature hath bestowed voluntary mouing, ech where on the skinne both aboue in the forehead, and be- neath in the cheekes, to the end that sometyme by extension and stretching, other- whiles by replication and enfolding therof, within it selfe, the eyes may both o- pen and shut, which that it might be done, because no part without Muscle hath voluntary mouing, by Nature benefite the substance beynge vnder the skinne of the forehead and nose, is made Musculous. For the fleshy Membran (as is sayd) beynge here made Musculous, is also encreased with many fleshy Fibres, and those of branching sinewes lent fro the brayne, as is not obscurely taught in the History of the Perues. Furthermore this Membran of the nose and forehead is to the skinne moze fast, and holdynge (without the interuente of any fat or ve- ry small) then in any other part of the body: so that it seemeth as if the Membran & skinne there were made one body, which is so put into the mindes of some A- natomistes, that they suppose the skinne of the forehead to be of carneous and Musculous substance and the seruyng Muscles to those partes are many.

First, y. sited in the forehead, rising from the superiour part, doe end in the inferiour part, in the common seame that seuereth the bones of the head from the Bones of the vpper iawe. Moreouer the Fibres of that Musculous stocke, mutu- ally tying to the sides, that is from the toppe of the nose to the middle of the fore- head, that consisteth betwene the first rootes of the heares and the eye browes, and vnto the sides therfore of this place they seeme moze fleshy, all runnyng vpward (sayth *Vesalius*) with a straight pathe: except a very fewe that chuse an oblique rase. But here I maruelle how he was deceived, for *Columbus* hath agaynst him these wordes. The Fibres of these Muscles are no where straight as *Vesalius* hol- deth, but oblique, that is to say from the toppe of the nose towarde the temples, and their action is to lift by eye browes: although neither Galen so well defer- ying in the Art of Medicine, nor yet *Vesalius* in our tyme a man of great name in the Art of dissectynge, neither any that wrote before me haue acknowledged it. Who, if they had used greater diligence, might as easily also haue found it.

These y. Muscles occupy the whole forehead, and as much of the tempozall Mus- cles, as how much they obliquely asseide beside the middle of the forehead, where we contract and wrinkle the skinne, as oft as we are much styred to anger, or sodaine admiration: and that so much in some men, as that the eye browes seeme mutually to touche together. Whiche contraction of the forehead might by no meanes be, if there were but one Muscle onely. For the moze perspicuous proue wherof, *Columbus* maketh mention of a certayne Cardinall, in whose forehead these Muscles might euidently bene sene: of which, the least sufferyng couulsion by the meanes of a wounde, halfe of the forehead moued, the other halfe refused. But lettynge this passe, let eche man iudge accordyng to truth and reason, since it is aptly to be found without any great do. For if you take away the whole skin of the forehead, in the middle of the forehead you shall see no Muscle, but in the toppe of the nose, where the right with the left Muscle is so contopned, as that they seeme there but one, beynge also moze fleshy then any where els. Likewise the higher that those Muscles ascend, by so much the moze thynne and slender they become, yet are not the eye browes drawne vpward by the meanes of these onely, but also by the helpe of y. Muscles, which hereafter we will describe: be-

Of the Muscu- lous substance of the Membran of the face.  
Gal. Lib. 2. part.

The brittle of the mouable summe in the face.

Gal. Lib. 9. part. The fleshy mem- bran in the face hath Fibres, and branching of Nerves.

Vesal. Lib. 2. Cap. 8. Col. Lib. 5. Cap. 1. The Muscles of the forehead.

Vesalius.

Columbus. The Fibres of the y. first 11. muscles are oblique.

There situation.

There are y. mus- cles of the fore- head and not one onely.

One of these mus- cles wounded halfe the forehead moueth not.

How the eye browes are drawne vpward. The Muscles of the nose.



ping not well knowne (as I suppose) of any other Anathomist save *Columbus*.

Also there are ij. dilatng the nose. And although Galen & others haue made mention of the ij. Muscles that serue to dilate the nose, yet haue they confusedly mingled them together with the Muscles of the vpper lippe. Besides these, *Vesalius* describeth y. that serue to shut the nose, and that he imagineth them to lye in the inner part of the nostrils vnder the tunicle that compasseth them within. Which to be so, *Columbus* by no meanes may acknowledge: for how (sayth he) may that be seene, which can no where be found?

The ij. Muscles therfore that dilate the nostrils, spring from the aforesayd seame, so that the rising of them is sharpe and fleshy, mixt with the end of the Muscles of the forehead and downewardes stretchyng or made broader, and carried aloft on the Bones of the nose, to end at the pinices or wynges of the nostrils. It is almost made ij. square, wherof y. sides are long, but the thyrd short. These draw vppward & said wynges of the nostrils, & haue straight Fibres, therfore they dilate: but those which other Anathomistes haue described are a portion of those Muscles which are placed in y. vpper lippe. As by & y. shalbe sayd. The nose is shut by y. muscles assitant to y. vpper lippe, therfore not of any proper muscles addited to no other vse. Which the more manifest to make you vnderstand, note, y. whesocuer we are willing to draw any thing vnto our nostrils, or vnto vs by y. nostrils: we are constrained immediately to pull & draw together y. vpper lippe.

There are besides, others almost foure squared Muscles sited in y. necke, which beare their office to the lippes seruyng to draw them obliquely downeward, and of these Galen was the first inuentor. The substance of them is a carneous or fleshy Membran, begon about the region of cannell bones, and posterior part of the necke, so as that their Fibres obliquely ascend, and there at length do meete and touch whereas the superiour with the inferiour lippe is ioyned. Wherefore since that these broad Muscles are seruicable vnto the face, yea although their chief situation be in the necke, yet are they to be numbred among the Muscles of the face, beeyng much coherent with the chinne. And therfore to the openyng of the mouth seeme much assitaunt.

The number of the Muscles seruyng to the lippes are iiij. that is, y. in the vpper, and as many in the neither. The originall of the superiour Muscles is foura manner of wayes, rising from the extreme Suture of the iugall bone, as also from the same that distinguisheth the first bone of the vpper iawbe from the thyrd: the other ij. are brought from the bone of the cheeke, and all go obliquely towardes the lippe, among whiche there is one that cleaueth to the wyng of the nostrils: & for that cause, they would haue it the Muscle, that should dilate the nose. But *Columbus* calleth it a portion of the Muscles aforesayd mouyng the lippe. Notwithstanding sayth the same authour, because I will not seeme stubburne in my one opinion, for that I haue alway abhorred, if any man please to separate this, & esteeme it to be in the place of a peculiar Muscle, it shalbe lawfull vnto him for me, which beeyng graunted, then there shalbe iiij. Muscles of the nose, whiche all shall serue to dilate the same.

The other ij. constitutyng the neither lippe, do spring from that part of the chinne, where is a certaine conspicuous asperitie, or roughnes in the bone. But now the Fibres of these foure Muscles are diuers myred, and enfolded within them selues: and therfore (as Galen rightly hath noted) show diuers sortes of mouynges, beeyng for the most part mingled with the skinne.

Vnto the sayd Muscles come other y. of the cheekes, sited betwene both the iawes, both springyng from the gummes, and also endyng in the gummes. Therfore where it pleaseth you it is lawfull to appoint the beginnyng, that is to say, whether aboue, or beneath, it forceth not. They be sufficient slender, and in the

the maner of a circle intersected with diuers Fibres, and therfore endelved with diuers giffes: for like handes they serue to thrust the meate hether and thether, not vnprofitable in tyme of speech, when we will either puffe vp the cheekes, or blow forth the breath. A further vtilitie of these Muscles, is dayly proued of the that with trumpets, and thalines do dayly exercise their blast.

There are y. Muscles, yet hether to be reuoked and brought to light which negligence (before my authours tyme) hath passed. They are to be seene in the posterior part of the head, rising aboue the Mammillar Processes at the Labial Suture. They are in forme triangled or ij. square, and endyng in the fleshy Membran, which also admitteth the Muscles of the forehead. Neither are their vses and vtilities (in drawyng the forehead and skinne of the head toward the hinder partes) to be neglected, as I suppose it doth in every man. And *Columbus* (besides *Iohannes Anthonius Platinus* his master, whose skinne of the head he reporteth euery where and evidently to moue) sayth likewise, that in him selfe beeyng bald it is most perspicuous.

But to come vnto the eyes, the Muscles of the eye liddes are vij. in number, that is to say ij. on either side. Wherof y. are situated without the compasse of the eyes whiche most certainly may be supposed to be the onely cause, why all Anathomistes (before *Columbus*) were so deceaued, in supposing those sited within the compasse of the eyes to serue not to the eye liddes, but the eyes.

The first therfore are iij. compassyng haueyng also circled Fibres. They spring in the great corner of the eye, in the common suture both to the head & vpper iawbe. Their beginnyng is sharpe, but are dilated vppward toward the forehead, in which place they are mixed together with the Muscles of the forehead. Afterward stretchyng toward the care, & the nearer they come to the lesser corner of the eye, the more they are amplified, and downewardes reflected about the roundell, of the eye, that at length neare to there beginnyng they might finish with a sharpe end. And these are made strongly to shut, and bynde together the eye liddes, whose force we dayly proue when we winkle, to preuent any outward iniurie.

The second are ij. straight Muscles, broad and fleshy in y. superiour region of the eyes, beginnyng within the roundell at the visible Serue like vnto the other Muscles of the eyes. These Muscles do cease with a little broad end in the vpper eye liddes, and their office, by drawyng the eye liddes vppward, is to open the eye.

The third Muscles seruyng to open the eyes, are in figure round and slender, springyng from the same place as the aforesayd: doe end towardes the great corner of the eye obliquely in the eye liddes with a tendon almost round. Though a portion thereof in some men is inserted to the tunicle corner, for that they are thought to helpe the mouyng of the eye vppward: but for this vse they are especially ordained, that is, to draw the liddes vp, and open the eye.

Herein rashly iudge me not (gentle Reader) that I seeme wholly to subscribe vnto the sentence of one mans opinion, for therein thy selfe shall, but seeme more affectionate to *Vesalius*, then equall in iudgement, and more sioyne to Galen his authoritie, then desirous of the true light. For I follow not *Columbus* sanctastically, but omitting to say what due proues I haue often made of many his assertions, I am forced to subscribe vnto him in sondry places, since nothing then truth may be truer. And other places as this which I was not able to search, I haue followed for his likely reasons. And sure my hope is, that thou shalt scape a much commoditie (frendly Reader) by the description of such partes as here by hym I haue inferred, as by any Anathomist that ever writt before him. For among the Muscles of the eyes all the Anathomistes before account the foure last recited. Which he approueth seruicable to the eye liddes, as you haue hard, although they be situated within the compasse of the eye, whiche he suspected to be the

The creature any end of the Muscles of the cheekes are comitted, Frontale, Frontice, Frontice, 106.

*Columbus* lauded, The Muscles to the eye browes of none before *Columbus* noted, Frontice, Frontice, 106.

The Muscles of the eye liddes are sixe.

The cause of error in other Anathomistes.

Frontice, Fibres, Situation.

The Muscles shutting the eyes

Muscles opening the eyes.

The Muscles drawyng the eye liddes.

The error of *Vesalius* and other Anathomists.

D. y. onely

There are not ij. Muscles seruyng to shut the nose.

The creature, progreffe, fourme and end of the Muscles of the nose.

How the nose is shut.

Two broad Muscles in the necke.

Substance.

Wt.

The lower Muscles of the lippes Rising.

The cause of error in such as would haue the nose dilated by a Muscle. Lower Muscles of the nose.

The creature of the ij. Muscles constituting the neither lippe. The vacterie of Fibres mainly vacterie of motion.

Two Muscles of the cheekes.

The Muscles of  
the eyes.

No vertue with-  
out his proper  
organ.  
How necessary  
moving is to the  
eyes.  
Gal. lib. 10. v. 6. part.

The motion of  
the eyes is arbi-  
trary.

Authors in the  
muscles to eyes  
not agreeing.  
The intent of the  
author.  
Truth is most  
ancient autho-  
rity.

Gal. lib. 10.  
The description of  
the Muscles of  
the eyes after Galen  
and Vesalius.

Gal. lib. 2. Cap. 11.

only cause of their error.

But to make registre, it followeth yet further to prosecute the eyes, I meane, to describe the Muscles appertayning unto the moving. For no man may deny the eyes (which are so copiously endued with voluntary moving) to haue Muscles to them at ech poynt seruiceable, since no vertue is boide of his proper organ. But contrariwise if the eyes were without Muscles, so were they also without moving, & beyng immovable, we should perfectly see but few thynges, and those straight forwarde. For perfect sight is had of nothing neither bywarde, downewardes, sidewardes, nor obliquely, but the rectitude of the apple of the eye guided and moued accordyng to the will of the body which is voluntary: as the motion els of euery exterior part and visible member.

But to say what Muscles, and what number of them are seruiceable unto the eyes, for asmuch as neither in this do the Authoꝝ accord, I shalbe perhaps misliked agayne for swaruing so much from the ancient Authoꝝ: yet unto the wise I meane to giue no such occasion. For in expꝛessing of both, I leaue unto euery one that readeth the best to be chosen. The circumstance therfore equally wayed, yeld auncientie unto the truth whether the Authoꝝ therof was first or last.

The eyes therfore haue foure maner of mouyngs voluntary (sayth Galen) as one vpwꝛd, an other downeward, and other ii. to either side, it is mete they had as many Muscles also as guides of their mouyng. Wherfore there is one resident in either side of the eye, and the other two placed one aboue, and an other beneath: for all these beyng dissolued into sinewy Filamentes, make one circle of a broad tendon ending in *Iris*. But besides, that the circumaction of the eye might be the surer, Nature made two other Muscles and placed them in oblique sorte, one in one eye lidde, and the other in an other, extended both aboue, and beneath towardes the lesser angle or corner.

Furthermoꝛe of these vi. Muscles the first iiij. euen as they yeld straight motions to the eye, eue to are their seates accordyngly set straight, and all ech where answerable one to an other. The heades of them haue their begynnyng, as from the hard Membran of the bꝛayne, coueryng the visible sꝛue, and from the sinew of the second payze of the bꝛayne, immediately after the comyng forth of the visible sꝛue out of the Scule. Moꝛeouer their belly is moꝛe ample and large, then deepe and profound, yet in sight is most round, lying to the posterioꝛ region of the eye and visible sꝛue, after the longitude of it in goyng from the Scule unto the rote of the eye: and whereas the same belly approacheth neare the middle seate of the eye where it is broadest, there it maketh an end with a broad Membranous enneruation. Which is in deepe beyond the middle part of the eye, and directed to the hard tunicle therof, like as if it were to the mouing of a bone: but beyng brought after the longitude of the body of the eye: it is settled to the line neare *Iris* or the greater circle of eye, as in the former part of the eye appeareth separatyng the blacke from the white.

Agayne, the Muscles of circumduction, or they that lead the eye about are in fashion lyke to the first, and also in begynnyng, yet lesse, and in the manner of their situation and insertion differing from them. For the first hath his begynnyng from *Dura Membrana* clothynge the visible sꝛue from the region of the lesser corner, and is inserted to the lower seate of the eye with his sinewy thinnes, and with an oblique lyne neare to *Iris* after the manner of the rest. The other spryngeth from the Membran of the visible sꝛue, out of the region of the greater angle of the eye, and sustayneth his sinewie tenuitie to the hard tunicle of the eye, with a moꝛe crooked lyne, at the vpper seate of the eye. Whereby it appeareth, that the Muscles of the eye do varie among them selues onely in situation, and by insertion to the hard tunicle of the eye. For the iiij. first (as is sayd) are

are wholly straight, and with a moꝛe straght line inserted. The other ii. moꝛe crooke, or sꝛopwise, attempt their insertion with an oblique line. Which although they are auayleable for circumuersion, yet besides they moue the eye both vpwꝛd and downeward.

Further those Muscles together whilest yet they obserue their proper place, are reckned in figure like a Peare made sharpe beneath and broad aboue: whose sharpe end is their begynnyng, but the broad part or seat, their insertion. In their short space they are knit together to the visible sꝛue, conspeying in the capacite (which by makyng together they make) much hard fatte, which other where, in the description of the eyes we haue spoken of at large. Wherby all these sayd sꝛue Muscles, produced from the hard Membran of the bꝛayne, coueryng the visible sꝛue, or in compassed forth inserted with Membranous tendons in the anterior seat of the hard tunicle, neare to the sides of *Iris*. The first therfore, which is in the great corner, bꝛaweth the eye inward towardes the nose: the second lying in the lesser angle, leadeth the eye there towardes: the thꝛd lying beneath, bꝛingeth it downewardes: the fourth aboue, toward the eye browes: and the fift, and sixt circumuerte, and turne the eye about ech way.

Besides those vi. Muscles, there is yet an other great one hid on ech side by the others, and compassed about with the aforesayd fat. This sheweth the same likenesse that the other vi. do figure together: for from the hard Membran mouyng the visible sꝛue, it hath his begynnyng, but somewhat moꝛe forwarde the first sꝛue. His begynnyng is fleshy, as the rest of the body therof, that round compasseth the visible sꝛue, and beyng stretched forth from the begynnyng to the foure partes like a Peare or pine apple, increaseth, and enlargeth by litle and litle vntill it touch the posterioꝛ part of the eye, whereto it is implanted as a circle. Neither doth it assay this insertion neare this visible sꝛue, but almost where the eye begynneth to encrease the largest. This Muscle listeth the eye vpwꝛd, and downeward, and therewithall turneth it.

Hetherto (as briefly as I might) thou hast to consider of the Muscles of the eyes, abstract sensibly from Galen, *Vesalius*, and the rest of Anatomistes, who all described the eyes of beastes, & not of men. Because I wilbe purged of all superflition of partiall iudgement, thou shalt thy selfe (frendly Reader) discusse the case, and since both the wayes are layd before thy face, see if thou canst separate the eye of man from beastes: the worthiest of both beyng most diligently practised by *Columbus*.

Witho in stæde of iiii. Muscles which they attribute to the eyes, accompteth x. sufficient to them both, that is, for seuen, fife in euery eye: neither are those iiij. placed (as appeareth) most fit for the opening of the eye liddes, to be numbered at all amongst the Muscles of the eyes. But there are iiij. long Muscles, which appeare towardes the rote of the visible sꝛue, haue straight Fibres, and end in sinewy tenuities, and are knit in round compasse to the Membran corner, there constitutyng an other Membran, which is not so farre extended as to touch *Iris*. They are placed like foure corners, wherof ij. aboue, the rest beneath. And these Muscles either vpwꝛd, or downeward, from the right side, or from the left do turne the eye, that is to say, when any of them by them selues, or a sinder do labor, els ii. at once. But if altogether worke with a subsequent mouyng then turnes the eye in circular sort. Neither esteeme this as a new saying, since the like is proued in the iiij. Muscles seruyng to the wꝛest of the hand. Moꝛeouer they are made to stay the eyes, that is, when alwa at one tyme do worke together.

And the fift Muscle, which onely he and first of all inuented, is thus described. It is sited vnder the other iiij. betwene which, and this, the fat is entercedent. It is placed ouerthwartly, and complecteth the halfe of the eye: it spryngeth

Galen. libid

Col. lib. 5. Cap. 9.  
The description of  
the Muscles of  
the eyes after Re-  
aldus Columbus.

How the Muscles  
of eyes are situ-  
ated to mouyng.

Subsequent mo-  
uings that is, one  
Muscle follow-  
ing another.  
How the cirkled  
mouing is made.

How the eye is  
stayed.

The fift Muscle  
of the eye newly  
inuented.

.iiij.

geth

geth from the Membran corner, and also endeth in the same. So that, which is the end, or which is the beginning, it is not easie to finde. We therfore iudge it a Muscle maruelous, both beginning at the eye, and also ending in the same: so that it is hard to say what is the proper moving of this Muscle of the eye. Yet (sayth he) if the beginninges of Muscles should proceede from Perues. I durst then truly affirme the beginning of this Muscle to be in the midst, for there goeth in a notable branch sufficient thicke (if it be compared unto the Muscle) brought from the second coniugation of the brayne, which Perue I graunt me to haue oft suspected to be the tendon of this Muscle: & this Perue if that you draw, the eye turneth upward and round about, although the Muscle be vnder it. And peradventure this is the use of that maruelous Muscle, that by the helpe therof we behold the heauens, and worke of his Diuine maiestie, whereto we be bounde, to the fulfilling wherof, this sayd Perue is no little, or meane helpe. This same Muscle thus described, hath on the side (for it forceth not now whether you call it the side end or beginning) a little broad tendō, wherewith it cleaueth to *Cornea*.

Truly I could now wishe that some great searcher of natures secretes were giuen vnto me, of whom I might learne the vtilitie of this excellent muscle. In the meane tyme it is sufficient, that I haue inuented and described it. I speake now of man; for *Vesalius*, and *Galen* haue described the eyes of beastes, and not of men. As whosoever conferreth their descriptions with the thyng it selfe, shall easily know.

Betweene this and the other *iiiij.* is fatnesse, lyke as betwene it and the visible Perue: but that the muscle which *Galen*, *Vesalius*, and others haue described, accompyng it now in the first, and then in the seventh place, is no where in the eye of man to be found, and may be deuised into *iiij.* muscles or moe: yet not withstanding they haue elegantly described it, and so, as in *Oren*, *Höfles*, *Weather's*, and such like fourfolded beastes is easie to be seene and found. Thus far *Columbus* of the muscles of the eyes, which I now commit to iudgement, hauing done my part therein with sufficient prolixitie.

Now it seemeth time to go forwardes with the Muscles of other partes, therfore those of the nether iawle let vs see how they may be described. For the eares haue no proper mouyng: but in beastes, neither therfore any muscles bearyng dutie vnto them. Albeit *Columbus* repositeth in a certaine man to haue found a muscle springyng from the cheekes, and ending at the lappe or wyng of the eare, to giue voluntary mouyng toward the Anterior partes, an other also some tyme in the posterior part, proceeding from the Mammillar Procelle. But surely these in men are so rare as that they deserue no notable description.

The nether iawle not onely in man, but also in all creatures moueth, and not the vpper iawle, exceptyng the Crocodile: who (as *Plinie* sayth) deuoureth with the vpper iawle without any mouyng proper to the nether: and the *Popiniaye* whom *Columbus* first espyed to moue both at once. In figure the nether iawle and vpper in man differeth from beastes, the one for the thynnes, the other for the length therof: because so it behoued that beastes in not hauyng handes, should to helpe them, for the receipt of meate in their mouthes, haue longer iawles, nature not beyng carefull for their proportion: which contrariwise in man be most round and short both for the bewty of the face answerable to the rest of the body, as also that he hath handes to reach, and put forth at his pleasure, albeit that the Ape somewhat nearely counterfaiteth the same: with handes, and all after a forte. And there be *iiij.* voluntary mouynges chauncyng to the nether iawle, that is, it openeth, shutteth & turneth round. The Muscles therof are *iiij.* on both sides.

The first of them is called the tempozall muscle, beyng so strong, and famous because it is next vnto the brayne, and hath many Perues inserted thereunto, and

and therfore that deuine Hipocrates in his booke of Woundes in the head, sayth *Dextro Tempore vulnerato, sinistram conuellitur*. That is, the right temple beyng wounded, the left is drawen together. Wherfore Nature, not vnaduisedly used such deligence, and care towardes this Muscle. It springeth therfore from the first bone of the vpper iawle, from the Cannell bone, from *Frons*, from *Sinciput*, and from the bone of the temples called *Lapidoides*, and occupieth the side of the head euen to the posterior part of the eare, and y<sup>e</sup> superiour part also by the breadth of *iiij.* fingers endes. The beginning therof is broad and halfe circle like: and albeit the beginning is broad as is sayd, notwithstanding it finally endeth sharpe, and in a strong tendon, fastned to the sharpe Procelle of the nether iawle called *Coronon*, which tendon beginneth sufficient deepe, and inwardes. There is beside an other Membranous tendon, which maketh the exterior part of the Muscle blacke, & is caried vnder the Jugall bone. This Muscle hath one office, that is to shut the inferior iawle, & the Fibres of it runne from the outer borders to the centre or middle prickle therof. Which thyng is diligently to be noted of all Chirurgicalians, whilst in this part they enlarge woundes, or cut any other abresse that infecteth the part, least they happen transuerfly to separate his Fibres: which beyng done, the vse of them ceaseth: which taken away, the life deserveth.

And because that kynd of mouyng which is to shut and breake ech hard thyng, needed force and deue strength, prudent nature besides the tempozall, made an other Muscle to lye in the mouth, which is sufficient strong, and springeth from the cauitie contained in the winges of the Cuneall bone, and endeth in the anterior part of the inferior iawle, where the roughnesse is. The Fibres therof are straght, hauyng likewise a tendon strong sufficiently, which is endewed with the same office as the tempozall Muscle, and is thicke and short.

The third Muscle is that which is called *Massetores* or *Manforius*, which moueth the nether iawle. In circled sort it springeth from the Jugall bone, and from the first Bone of the vpper iawle, but not from the thyrd and fourth Vertebre of the necke, as *Galen* would. It hath both a fleshy & tendinous beginning, but the end in the inferior iawle is almost *iiij.* cornered. Furthermore it cleaueth to the Sharpe Procelle of the same, where it seemeth to ioyne with the tempozall bone. It hath diuers Fibres, and therfore moueth the iawle forward, backward, to the sides, and in compassed sort, beyng of it selfe sufficient thicke.

The fourth muscle openeth the mouth and iawle, and is very proper chusing two fleshy bellies, the beginning and endlesse, for the middle part therof is tendinous: the beginning therof from the Procelle called *Sroides* is fleshy: it is carried vnder the iawle, and vnder the eare: it is in figure round, & long, but not very thicke: it cleaueth at a fleshy substance in the midst of the chinne, where a certaine roughnesse is inwardly discerned. Nature made not this so thicke, as those that are chosen for the shutting of the iawle. For those two muscles of the iawle beyng relaxed, which we haue sayd to be sited aboue on both sides, by reason that the nature therof is sufficiēt heauy it enclineth or falleth downward, easily therfore contented with a smaller muscle to open, then were behoufull to shut. But the middle part therof is made as a tendon, least it should take to great a rowme: for the place was streite hauyng therein many organs placed. To conclude, this muscle, when it is gathered together of it selfe, the mouth thereby openeth, and it is therfore the Author, of mouyng y<sup>e</sup> nether iawle to the inferior partes, as is sayd.

Where *Hyoïdes* is placed, how it is fourmed, and to what end and vse it was created, we haue not spared to expresse at large in the Hypochoy of bones. It shall therfore not be in bayne, when thy eye is here, the finger be there. I meane that thou conferre the infection and situation of the muscles therof, vnto the manner, forme, and fashion of the thyng it selfe, neither in this onely, but thoroughout

D. iij.

out

A confectionall  
knowledge of the  
motion of the  
eye.

Columbus here  
busheth into a  
deuinent desire to  
know this  
newly  
inuented Muscle.

Muscles of the  
eares.

The Muscles of  
the eares in man  
are very rare.

Plinie. Lib. vii. Cap.  
17.  
The Crocodile  
moueth the vpper  
iawle onely.  
Col. Lib. i. Cap. 18.  
Lib. v. Cap. 2.  
Col. Lib. i. Cap. 9.  
The Popiniaye  
shutteth both at  
once.  
These voluntary  
mouynges of the  
nether iawle.  
The Muscles to  
the nether iawle.

The tempozall  
Muscle.

Hippocrates.

The rising of the  
tempozall Muscle.

The Muscles called  
Coronon.

A caution to Chi-  
rurgicalians.

The Muscles lying  
in y<sup>e</sup> mouth.

The Muscles called  
Manforius or  
Massetores.

The fourth Mus-  
cle opening the  
mouth.

Why nature  
made not the  
Muscle to open  
the mouth so  
large as those to  
shutte it.

The Muscles of Hyoides.

The first Muscle of Hyoides.

The second Muscle of Hyoides.

The third Muscle of Hyoides.

The fourth Muscle of Hyoides.

Lib. 1. Cap. 11.  
Lib. 1. Cap. 17.

The use of the 4. Muscle.

The fourth Muscle serves not to lift up the shoulder blade, without lifting also Vesalius.

Of Muscles not proper to Hyoides.

The utilities of the tongue. Substance. Galen. Lib. 11. v. f. Part.

Magnitude. Situation. Figure.

The Muscles of the tongue are nine, or as some account 11.

The Ligament which is in infants to be cut.

The 11. Muscles attributed to the tongue.

The muscle closing the tongue.

out also the whole discourse of Muscles I with the Reader to observe the same rule, for the more assured perfection. The muscles therefore that make the moving of Hyoides are in number viii. that is, iiij. on each side.

The first that appeareth is fleshy, thinne, and straight, springing from the inside of the toppe of Sternon. It iourneth aboute *Aspera Arteria* and *Larinx*, and endeth in the inferiour part of the sayd bone without a tendon, hauing straight *Fibres*, and therewithall draweth directly downward.

The second goeth out from the chinne, and endeth in the vpper part of *Hyoides*. This hath no tendon, but is wholly carneous: hauing straight *Fibres* also, moueth straight vpperwardes answerable in the contrary part to that, which next before I named.

The third muscle is subtill, and litle, begynninyg at the Proccesse *Styloides*, and endeth in the laterall partes of *Hyoides*: sited obliquely, and seructh to draw vpperwardes obliquely. But the iiij. Muscle cometh from the vpper part of the scaple bone, and ascendeth vnder the seventh muscle of the head obliquely. It is small & long, yet neither longer nor leaner then other muscles, if we may credit *Columbus*. Albeit *Vesalius* sayth there are no muscles in the body longer or leaner. It is ended in the lateral partes of *Hyoides*. It obtayneth the tendon in the middest like as the fourth Muscle of the inferiour iaw, although Galen would graunt one ly to that, a tendon in the middest, and to no other, extollying therfore nature as though she had wrought in the Muscle a rare and notable point, which she had denyed to all others. Vnely this cannot be denyed, that the tendon of this muscle, which we now describe, is not so long as of the other. But the use of it is to draw this bone obliquely downwardes with a contrary moving to the third muscle. Galen supposed, it lifted up the shoulder blade, when as (saith *Columbus*) he slightly marked how impossible it was to be done, or that so small a Muscle springyng fro *Hyoides* (as he saith) which bone is moueable, should draw or lift up the great weight of the scaple bone. And these be the iiij. payze of muscles properly springyng to *Hyoides*. The muscles not proper thereto haue thence their begynninyg. Wherof some to *Larinx*, the rest are stretched to the tongue.

The toug is the worthy organ of utterance, yet, that not all the utilities therof appertainyng. For in eatyng, drinckyng, & tastyng the office therof is notable, and most exquisite; the flesh of it is rare, fistulous, & soft. The magnitude therof agreeable to the greatnes, or littleness of the mouth. The acuitie therof therfore sauereth rightly of the Muscles, thereto seruing. Of the place no man is ignorant: the fashion therof is long, and more broad then profound and thicke (albeit that the toung in thrustyng directly forth becommeth almost or altogether round) the roote of the toug is thicker then the end: which was prouident by vnder of nature, because it behoued it to moue swiftly. As the furtheraunce wherof are iiij. Muscles accordingly bestowed, besides his own peculiar substance, which, in consideration of the substance before rehearsed, seemeth not proper to be named amongst Muscles; yet, by an other reason, which is because it moueth volutarily, it seemeth not worthy to be seuered fro among their number. Which if it be not, y. more must be added to the number aforesayd, so that then we must account xi.

For if seemeth (if so it must be described) y. muscles, the toung hauing in the middest a white lyne, to distinguish the right from the left part, vnder which is a Ligament in children (oft tymes) requiryng to be cut, because it is an impediment to their speech, and at first to suckyng. These y. muscles attributed to the tongue or rather fourmyng the same, rise from the ground of *Hyoides*, and end at the extremite of the tongue, tastyng the force of euery lynde of *Fibres*: which also are so intertexed and woven together, as that one from another, as in other Muscles, cannot be disyned. Where betwappeth the tongue a certaine tunicle, which

which receiuyng of the vertue that is proper to the fourth payze of finelnes of the brayne, purchaseth thereby most elegantly the facultie of tastyng. Wherof in like maner is stretched to the tunicle of the Palate, as shalbe declared hereafter, the which tunicle is both common to the Palate, *Esophagus*, and *Larinx*.

The third and fourth Muscle of the toung which *Columbus* sayth was not known to the other Anatomistes, begyn at the middest of the chinne, where be two Asperities or rough places, directly agaynst the roote of the toung goyng. Where *Fibres* are straight, the Muscles them selues round, and it appertaineth to their office to thrust out the toung beyond the teeth and lippes. Neither is it any miracle (as some suppose) that the toung can doe this without the helpe of any Muscle.

The fifth, and sixt are slender, begynninyg at the Proccesse *Styloides*, and end in the sides of the roote of the toung. These haue power whylest both labour, to draw the toung towardes them selues, but one onely mouyng, draweth it vp to a side.

The viij. and viij. go forth from the Proccesses of *Hyoides*, and are inserted to the sides of the toung: seruyng to draw it downwardes.

But the ix. and x. rise from the iaw, and are fixed to the sides therof. And haue proprietye now hether now thether to impell and moue the toung, when we eate, or swallow.

The last muscle is more rightly to be called a confused muscle of flesh, fat, and glandulous matter together, then truly a muscle. It is put in the roote of the toung, and is brought from *Hyoides*. Beuyng in eatyng pleasaunt and swete: as is proued in such creatures, whose tounges are vnto vs among the rest, acceptable sustenance. Neither shall it be here denyed the name of a muscle, for description sake, although (as witnesseth *Columbus*) it be a particle of small price: wherein therfore we will lose no tyme, least the speech of other matters should be ouer long detracted, which are more necessary.

Besides the xi. (therefore) which we haue hether to declared, besides these *Pernes*, *Ligamentes*, and membran, there are *Veynes*, *Arteries*, and two or ther *Pernes* begotten of the viij. coningation, and addited to this part for motion sake: which for as much as they be collocated worthely in the inferiour part, great care must be vsed lest together with the Ligament (as oft as it is requisite to be cutte) those also be vniuittingly deuicid.

By the Ligament is ment that, which by openyng the mouth, and reflectyng the toung vnto the palate, is to be descerned vnder the same, beuyng made for great vse and purpose. For hereto are firmitied the *Fibres* of the toung, beuyng in vse as if a bone were giuen to the toung, and no lesse to them a stabiliment stay, or ground. Whereouer were it not for the Ligament, the toung sometimes would be gathered to much backward in it selfe, neither beuyng once put forth would it be easely drawen backe agayne. Wherfore it is worthely a bridle vnto the toug, both forcyng it, and temperyng the same, least it should be either to much plucked together by the muscles (not hauing therein any bones or other stay) or els being flaked more then meete, might stray out of course. Besides if in the toung it had bene stretched but a litle way forward, or occupied but a small portion, it should haue pleased the toung as litle as if it had not bene made at all. Contrariwise agayne, if further towardes the end it had bene extended, then neither to the palate, upper teeth, nor to diuers places in the mouth, the toung could haue bene stirred. So exade therfore is the making therof, and with such moderation is it measured, that if you either adde a litle, or diminish a litle, you corrupt the action of whole instrument.

Whence the tongue hath the sense of tastyng.

7. 9.

5. 6.

7. 8.

9. 10.

11.

The Muscles in besides by sweet in eating.

The partes containing the tongue.

In cutting the 2. Ligament of the toung what is to be heed. What is the 2. Ligament of the toung. Vesal. Lib. 2. cap. 19.

The vse of the 2. Ligament of the toung. The bridle of the toung. Galen. Lib. 11. v. f. Part.

The prouidence of nature in creating this Ligament.

With what measure the Ligament is framed. Col. Lib. 1. cap. 11.

What Larinx is.  
Why the voyce is  
first formed.

Of the Muscles  
seruing to Larinx.

Why the author  
sometime testifies  
Galen and  
Vesalius.

Galen and Vesalius  
have described Larinx  
according as  
it is in beastes,  
and not in men.

Columbus.

Col. Ibidem.  
Lib. 2. cap. 10.  
The number of  
the Muscles of  
Larinx.

1. 2.  
The first ii. Mus-  
cles of Larinx be-  
ing of the commo  
Muscles.

3. 4.

The muscle com-  
plecting Aethy-  
phagus.

5.  
The opinion of  
Columbus differs  
from Galen, and  
Vesalius.  
Fuchius Galienus.

**L**arinx being the head of the rough Arterie, is the instrument wherein first the voyce is formed, which God the worker of all thynges, hath by marvellous art compounded. The place thereof is in the tawes, under the tongue and bone *Hyoides*. But since the bones thereof (for so *Columbus* calleth them rather then Cartilages) are before expressed in the History of bones, there remaineth now (because this so necessary instrument, of inspiration, and expiration, as also to the restraint of enery efflation after the will of the body, stande in neede of voluntary mouyng) to speake of the muscles giuen thereto for the mainteinance of his woorthy office.

Wherein (that from these my simple labors I may clearly wipe the blotte of error, least by such meanes or infection, they become odious to the hearers, and to me as to the unhappy husband men: who taking gladly great toyle with his ground and tillage, in hope of the harvest recompence, receiveth a sort of blasted cares mingled with that cursed coccle, in stead of the finest flaxen, and whyttest wheate which he trusted surely to had sowed), I am forced to abstayne a while both from *Vesalius* and Galen. Who whilst herein they dissected not the body of man, I know not whether we have more cause to shunne both their opinions in this respect, or conyngly to commend *Columbus*, for his integritie: not in finding the fault but for hatyng the fault, neither for reprovynge those authoys, but for his endeavour to amend the misse. But of the ii. it appeareth he most marvellously at *Vesalius*, not because his opinion herein is scarce approbable (for who knoweth not the best may sometime be deceived) but for that *Vesalius* neuer wavered wery to reprehend Galen for cutting Apes and not men, and shewing him selfe herein but a ridiculous carper, to describe & throte of a beaste and not of man: neither at all admonisheth the Reader thereof. The like negligence is imputed unto him, where he describeth the eyes, which in man (although the more difficult) *Columbus* protesteth onely to have folloved. Wherefore these be his wordes. Paruete not that I (speaking onely of man) do differ from the writing of the rest that have described & wyndyppe of beastes: neither that I meane to resist such excellent men otherwhere, but onely that I might take away those errorrs (truth being my guide as much as in me lyeth) I am forced chiefly in this argument, to depart from their opinions.

The throte therfore of *Larinx* hath muscles both proper and improper, but those not in number as other have accompted them, although *Fuchius* (imitating the mindes of Galen and *Vesalius*) would seeme to speake of the humane *Larinx*. For there be but of proper Muscles ix. and of the common v. being a sentence very dissimulant from those that say xii. proper, and viii. common.

Of which the first two spring from the toppe of the breast, whence also the ii. first of *Hyoides* had their beginning: they are fleshy enery where, but without tendons, and enbued with sharpe beginnings. They are extended about the rough Arterie, and are inserted to the nether partes of the two shield like bones, drawyng downwarde: and are much profitable, for that whilst they moue, they bynd beneath, and dilate the wyndyppe above.

The second common from the sides of *Hyoides*, being likewise fleshy, and (ending) draw neare unto the ii. first. So are their Fibres in like maner straight. These can dilate the nether part, and bynd together the upper: and contrary to the mouyng of the first, do lift the wyndyppe upwardes.

Of these (which we have called comen) the last muscle complecteth *Aethyphagus*: ardyng the deglutition, and swallowyng of meate and drinke. It riseth from the shield like bone, and hath transverse Fibres followyng the forme of a halfe circle, wherewith the laterall part of the wyndyppe is coated, & streined together. And this is one muscle and not ii. as Galen and *Vesalius* esteemed, who held they

they had considered diligently, imagined that those muscles spring from the posterior part of *Aethyphagus*, which is membranous, and soft, and had force to draw together & posterior partes of the wyndyppe: which is a thyng hard, and heauy. Wherefore (sayth *Columbus*) there is nothing in this left whereby to excuse them, when as a great absurditie should be folloved, if we should also affirme those muscles to proceede from thence, whose Fibres onely well marked, shall discerie them to be one, and not ii. deniable muscles.

Beside those, *Vesalius* writeth of other ii. common muscles, which being almost round, should spring from the middelt of the interior part of *Hyoides*, and either of them on both sides inserted to the rote of the body of the libde, or cover of *Larinx*: hauyng the proppertie, and office, as oft as it depressed with meate and drinke, to lift it up agayne immediately. Which in an Ox, Cow, or such lyke creatures is very true in dede, but not in man, loke thou neuer so diligently. Thus of the eight common muscles ii. being taken away, there remaineth but v. common they are called, because their beginninges are otherwhere, and their endes in this part.

The other ix. which are called proper muscles, because they begyn, and also end in *Larinx*, seruyng therfore thereto onely: are made for this cause to open & shut the Epiglottis, for *Glottis* is a long rift placed in the middelt of *Larinx*, the which (sayth Galen) the like substance is not to be found in all the creatures.

Of these ix. muscles the ii. first go forth from the Anular bone, the rest from the nameles Cartilage. They be small, and haue oblique or crooked Fibres, and end at the nether part of the shieldlike bones. They serue to bynd together the nether part, and dilate the uppermost. Neither in this place is to be imagined of any contrary mouyng: for the bones be hard, and being bounde together beneath, it followeth that they dilate & open above. The like doth & shieldlike Cartilages in beastes. But of these Muscles you shall finde one on the right side, and other one the left, albeit *Vesalius* noteth iii. proper Muscles in this place: of which he beleuen the first two to come from the shieldlike Cartilage, and to end in the nameles Crisfell. Whereat *Columbus* cannot marvail inough, since (sayth he) the unnamed Cartilage hath no mouyng at all, but must needes haue had if these Muscles (sayth *Vesalius*) that is two on eche side, are very like the muscles called *Intercostrales*. But that is denyed not onely in man, but also in beastes to be founde true.

But those second Muscles sited in the hinder partes towardes *Aethyphagus*, are long and fleshy, deriued from the posterior and laterall part of & Anular bone, & end directly at the fourth and fift bone by a Tendon: that is, in the inferior part: where it is coarticulated to the third bone. The end wherfore they were created hauyng straight Fibres, was to draw straight, and to dilate the aforesayd rift called *Glottis* towardes the laterall part. Which is oft shewed by the benefit of these ii. muscles. Wherefore by their office, ech grane or base voyce is bittered.

The third muscles came from the fore part of the Anular bone, and being oblique, are found to end at the fourth and fift bone, neare to that part where the second ii. do end, and not in the shieldlike Cartilage, as *Vesalius* would. These haue power to bynde the fore partes of the rift, and dilate the hinder partes.

But the fourth muscles begyn at the inner partes of the shieldlike bones, with which they coarticulate, and go obliquely, untill they are entred into the sayd bones which construe, and make *Aritenoides*, that is to say, in the laterall or side partes. These also when they make streite the anterior partes, do amplifie and enlarge the posterior.

The last muscle of *Larinx* is so small, that a lesse in the whole body besides  
p. ij. may

Lib. 2. Cap. 20.  
The other ii. com-  
mon Muscles  
which Vesalius  
writeth are not in  
man.  
Col. libid.

Why they are cal-  
led comen Mus-  
cles.

The nine Mus-  
cles of Larinx,  
which are called  
the proper Mus-  
cles thereof.  
What Glottis is,  
and where it is.

1. 2.  
Of the nine Mus-  
cles of Larinx  
whence the first  
two springe.  
The Anular or  
ringlike bone.

Vesalius creeth in  
the ii. first Mus-  
cles of Larinx.

Every Muscle  
worketh toward  
his beginning.  
Vesalius. Ibidem.  
Columbus deny-  
eth them to be  
like & intercostal  
Muscles.

3. 4.

How grane or  
base voyces are  
bittered.

5. 6.

7. 8.  
The 4. muscles of  
Larinx,  
The constitution  
of Aritenoides ex-  
pressed in & histo-  
ry of bones where  
Larinx is descri-  
bed.



The last and least of all y<sup>e</sup> Muscles of Lanes.

Howe Vesalius reckoned 12. Muscles to Lanes.

The authors good will to his country and by their.

Suspend yone iudgment till you see the truth.

Of the Muscles of the shoulder blades called also the scaple bones.

Gal. Lib. de Musc. Col. lib. 5. Cap. 16. Vesali. 1. 2. cap. 16. The number of the Muscles of y<sup>e</sup> shoulder blades: a be 4. motions of the shoulder blades.

The first Muscle of the shoulder blade, like a Monkeys hode.

The diuers motions of this oblique Muscle.

The hoolike muscle in man is not deuided, as in Apes.

Columbus lib. 1.

By the benethe of the third Muscle the shoulder blade is lifted up.

may not be found, it is placed querthwartly in the rote of those y<sup>e</sup>. bones which we last remembred, haupng ouerthwart Fibres also, like those of the last of the common muscles which embraceth *Esophagus*. This muscle thus described, hath libertie in bindyng together the posterour parte, there withall to dilate the Anterior.

But *Vesalius* by accompyng the first y<sup>e</sup>. propper, iij. and this last one, y<sup>e</sup>. made by the number of his rij. But since that, *Columbus* firmly auoucheth it to be but one muscle and to haue continual Fibres. As for my peculiar Ligamentes to this part, there is none, beside membranous enwrappng round the ioyntes.

**T**hus farre of the vocall organ, in describyng wherof as appeareth, is great dissention amog the Authors. But for my part, and that my labor might be more frutelessly employed, I haue endeouored to folow him that sheweth likeliest at y<sup>e</sup> marke. We sapient therfore Reader in iudgemēt, & not captious in caruing a fault, least it, beyng not acceptable to his appetite thou geneest it vnto, be restored to thee agayne with blame.

**I**t hath pleased others to entreate next of the muscles moung the head, but *Columbus*, because the greater part of them is contained vnder the muscles of the scaple bones, determined first to speake of these, and after them of the muscles of the shoulder, before he declared how the head is moued.

**T**he muscles therfore of the scaple bones (after *Galen*) be in number viij. on each side. Albeit the truth is (if *Columbus* and *Vesalius* were worthy professors) that by foure, each shoulder blade is moued. And iij. maner of mounges are appertinent to the scaple Bones, as vpward, or towardes the head, downward, forward, & backward. That which *Columbus* willet to be the first, *Vesalius* describeth the second, & the second after *Columbus*, is the first with him: but it forcethly not it is sufficient onely that they agree in their propper descriptions.

The first therfore hath the most rare and notable figure of all others in the body. For, being copared together with his fellow, it may not vnaptly be likened to a monkeys hode, and is therfore without any absurditie called *Cucullaris Musc*. It cometh forth from *Occiput*, and from the toppes of the ridge of all the Vertebres of the necke, and downe to the viij. Spondill of the brest: but in the hinder part of the head it hath an ouerthwart lyne, occuppyng the whole space that lyeth betwene *Occiput* and the eare: the begynnyng therof is sclēder, and so farre from *Occiput*, as to the viij. Vertebre of the brest, and endeth in the Procelle *Acromion*, and to the broader part of the canell bone. This muscle beyng compounded with diuers kyndes of Fibres, sheweth likewise diuers maner of mounges. For, by the meanes of the oblique Fibres of the vpper part, it draweth the shoulder blade obliquely vpward: by those in the midst, the same is led towardes the backe: but by the inferiour Fibres, it plucketh downewardes. It is very notable in figure, and accordyng to the raritie of his shape obtaineth a rare & peculiar name, that is a hoolike Muscle, or more seemely in Latin *Cucullaris Musculus* as afoze sayd. Which *Galen* deuided into ii. for so it is reported to be in Apes.

The second Muscle dedicated to the scaple bone, lyeth vnderneath the first Muscle of the shoulder, and springeth from the second, thyrd, fourth, and fift, but sel-dome from the vi. ribbe, and endeth at the lesser Procelle of the scaple called *Acromion*, both fleshy, and tendinous. Nature begat it to this vse, that by meanes therof the scaple bone might moue forwardly towardes the brest bone Sternon: but is nothing seruiceable to the shoulder, what soeuer *Galen* thought therein.

The thyrd Muscle is reached from the ouerthwarte Procelle of the second, thyrd, fourth, and fift Vertebre of the necke: and as it fleshy descendeth, so it wareth thicker and stronger, and finally is inserted to the vpper and inner part of the scaple: almost all the Fibres therof are straight, except a few that stād obliquely,

or slopwise. And this is vfed to lift by the shoulder blade, and to giue helpe vnto the first. For great and heavy is the scaple bone.

The fourth is a broad Muscle thine, and sower square, brought from the ridge of the fift, sixt, and seventh Vertebres of the necke, and from the iij. vppermost of the brest: it beginneth fleshy, and parteth tendinous, with oblique Fibres: the ende therof is after the hole longitude of the shoulder blade, which is therby carried backwardes.

**F**urther, the shoulder hath euery kynd of voluntary moung, as for example, vpwardes, downwardes, forward, backward, and round about, to the perfect rulyng wherof nature addited viij. Muscles.

The first wherof is great and fleshy, occuppyng the anterior part of the brest, and marcheth forwardes from the midst of the Canell bone towardes the brest Bone, followyng almost the whole length thereof, and from the Cristels of the viij. and viij. ribbe. The begynnyng herof is large and great, but it euer after diminisheth, and at length endeth at a Tendon short and broad: which is inserted in the anterior part of the shoulder vnder the necke therof. This Muscle hath diuers Fibres, and therfore leadech the shoulder diuersly vnto the brest, that is to say, higher, lower, and in the midst betwene both. *Galen* supposed this muscle to be deuided in iij. but that is denyed, albeit somtyme that in the nether part therof (as sayth *Columbus*) a certaine portion sharpe stretching out, is found in some men as though it were a muscle, when as in dede it is none. But (sayth the same Author) to this absurditie he hath added an other more absurd, by thynkeing the arme to be moued obliquely by meanes therof: which in Apes, and not in man is proued true.

The second muscle of the shoulder is iij. square, thicke, and intertexed with diuers Fibres, and is called by *Anathomistes* *επιτομή*, and *δεκτομένη*, and *Ιμμεραλīs*. It springeth out of the midst of the Canell bone, from *Acromion*, and the whole great Procelle of the shoulder blade: it hath a broad and tendinous begynnyng, but the end of it is sharpe: it is carried aboue the head of the shoulder, and endeth in the midst of the shoulder at a strong and ouerthwarte tendon, which tendon embraceth the middle thiknesse of y<sup>e</sup> shoulder: it consisteth of many Fibres, wherewith the arme is lifted aboue, forward, in the midst, and backward.

But the thyrd muscle of the shoulder is carneous and round, which from the inferiour part of the shoulder blade goeth forth which a fleshy begynnyng, with Fibres straight, from the begynnyng vnto the very end: & beyng situated obliquely, goeth forward aboue the anterior and bunched part of the shoulder blade, and goeth out into a broad and strong tendon, which planteth it selfe in the posteriour part of the shoulder: and it is the part of this muscle to draw the arme downward towardes the posteriour partes.

The fourth muscle is great and broadest begynnyng at the point of the ridge of the vi. Spondill of the brest, and descendeth by the point of all the inferiour Vertebres, euen to the halfe of *Os sacrum*. And this so long a begynnyng is ech where finely, but sclēder, and endeth at a broad, strong, and short tendon vnder the head of the shoulder, neare that place whereto we haue sayd the first muscle clequeth, that leadech the arme vnto the brest: betwene which is left the caustic which we call the armehale. Diuers Fibres hath this muscle, and therfore it is a meane to moue the arme diuers wayes downward, & that rather in oblique sort then in any other kynd of position. It hath iij. corners vnequally fited, for of them the one is short, the other y. long, and their originall is thus. The short stretcheth from this Vertebre, to the halfe of *Os sacrum*: and the other from that place vnto the end therof.

Columbus, Vesalius,

The Muscles of the shoulder and the manifold motions therof.

This Muscle is not to be deuided into 3. as Galen would.

2.

3.

4.

What Muscles do constitute the arme hole.

Col. lib. 5. Cap. 16.

The description of the fibres of this fourth muscle.

The fifth Musclet occupieth all that cavitie whiche is betwixt the toppe of the shoulde blade, and the greater Procelle thereof, springing from the posterieur part of it. It is fleshy, and endeth at a strong tendon, whilst it is caried vnder the Ligament that knitteth the shoulde and the scaple bone together. It endeth in the head of the upper part of the shoulde, much cleauyng also to the shoulde blade it selfe.

The first Musclet cōpasseth about the hole Gibbous part of the shoulde blade, but it issueth forth from the posterieur part after the longitude thereof. It is fleshy, much cleauyng to the scaple bone, and endeth in a thicke and broad tendon, which is inserted toward the hinder partes of the head of the shoulde.

The seventh is dedicated all the inner cavitie of the shoulde blade, where it cleaueth and lyeth to the ribbes: but it is begotten from the whole posterieur part of the scaple bone. So that it is situated betwene the ribbes, and the scaple bone: and the end of it is a Tendon sufficient broad, inserted to the inner part of the shoulde.

And finally these iij. Muscles, whiche I haue last made mention of, were ordained to the end that the arme might not want the power of circumaction, although the first (sayth *Vesalius*) seemeth somewhat to helpe the eleuation, or lifting vp of the arme.

Thou hast (Reader) to vnderstand by this word, shoulde, lately described, the mouyng that is geuen to the upper bone of the arme, & that is the most proper terme for it, for the same bone in Latin is called *Humerus*, which in English is shoulde, although in our domesticall phrase, we say the shoulde, when we meane the highest part aboue the arme, which in dæde is the Procelle of the scaple bone called *Acromiō*, in like sort, as by the arme we meane both the shoulde bone, and cubite. Thus for thy better satisfaction.

Now as it followeth, The head is moued by a first, and secondary mouyng. By the first mouyng is vnderstode the mouyng of the head with the first & second Vertebre, but the secondary mouyng is when it styreth together with the whole necke. It hath iij. proper mouynges, as one forward and backward, an other to each side, and the third when it turneth round, albeit these may fity be reduced into two, as into a straight, and an oblique mouyng. The straight with the first Vertebre, the oblique vnder the second is brought to passe: what soeuer Galen sayth to the contrary, of whose consultation in this matter for the mouyng of the head, read before in the Vltimoty of bones: where is described the first, and second Vertebre of the necke.

The Muscles seruyng to his proper mouynges are seuen on each side.

The first springing fro the Spine of the superiour Vertebres of the brest, ascending by the Vertebres of the necke, vnto the third, are afterwarde deuided, & runne slopwise towardes the hinder part of the head, where they end betwene the posterieur part and the eares. Their Fibres are straight from the begynnyng, vntill they come to the place where the Muscles are deuided: but afterwarde as they stretch upward, so farre their race is a slope, or oblique, and sufficient fleshy are these Muscles. Their office is whē both laboꝝ with one cōsent together, that the head might be drawne backwardes to the posterieur partes, but when the one worketh onely, then is the head compassingly turned to the one side. To those Muscles are thre sides, one from the begynnyng to the place whereas he is deuided from his fellow, an other from thence to the hinder part of the head, and the third from the hinder part of the head vnto their begynning.

The second Muscles are diuers, because they haue diuers figures and impressions, consisting of many partes tendinous, and very many fleshy: so that some suppose them to be fine Muscles. Although in dæde it is but one payze, as one

would say the right, and the left. They spring with a sharpe beginning from the transuerse, or ouerthwarte Procelle of the fourth and fifth Spondiles of the brest, and ascending upward, are at length fastned in the middelt of the hinder part of the head. Their situation is directly straight, & their office is to draw the head to the posterieur part straight.

The third Muscles are slender, whiche spring from the ridge of the second Vertebre of the necke, and end at length in *Occiput*, which is the hindermost bone of the head, but by the way, they go somewhat disioyned. The Fibres which they possesse are straight, therefore do they lead the head directly backwardes.

The fourth Muscles are hidden vnder the third, and are all fleshy euen as the third, but short, and spring from the posterieur part of the first Vertebre, where should haue bene a ridge or Spine vnto the same Vertebre, but that nature took it away because it might be no impediment or greuaunce vnto the effence of the third Muscles. In the middelt of *Occiput* is their end, and their office is to draw likewise the head backwardes directly. Neither is it any maruaile, why nature ordained so many Muscles onely to draw the head backwardes, for so it was necessary: since the Anterior part of the head is much more heauy because there is toyned both the face and nether talve. Whereby the forepart becommeth of right heauyer then the hinder.

In oblique sort are situated the fifth payze of Muscles mouyng the head beyng risen from the Spine of the second Vertebre, and ended in the ouerthwarte Procelle of the first. These Muscles are slender and all fleshy, seruyng to pull the head in round compasse together with the first Vertebre.

The sixth are also oblique, but contrary wayes they make a fourme of a triangle, & they begyn at the Procelle of the first Vertebre, so do they end in the hindermost bone (*Occiput*) of the head, and that in the middelt: these draw to the fore partes.

So these ij. last recited the v. & the vi. are the proper Muscles which moue the head round or in compassed sort, by the helpe of the first Muscles, and the last which yet are to describe. But now therefore they whiche are in the by. place are long, round, and strong, sited obliquely. Their Fibres spring from the toppe of the brest and Camell bone. They haue ij. begynnynges, betwene which lyeth a concavittie, or spare hollow. They are finewie and broad in their begynnyng, after also fleshy, and are planted to the Mammillar Procelle, which they imbrace. When both of them laboꝝ, the head enclineth forward, but as oft as onely one of them moueth, the head goeth to the side. They are further very strong, and able also to bow the head directly downward. But this more ouer is to be noted, that these Muscles together with the iij. Muscles of *Hyoides*, do make a great crosse in the necke. These hether to are proper Muscles seruyng to the first mouyng of the head.

Now to the secondary mouyng, whiche is attended by the Muscles of the necke, which mouyng, the head cannot but moue. And the necke it selfe moueth bothe forward, and backward, and to each side: and the Muscles thereto are on each side foure.

The first beyng placed in the forepart, produced straight from the body of the first Vertebre, of the brest, neare to the place where as it is knit with the ribbe, and in ascending it is knit to all the bodies of Vertebres, save that the middle part by which *Æsophagus* iournepeth they leaue vnseuered. These are the Muscles whiche are called *Latitantes sub Æsophago*, that is lurking vnder the stomacke: and these bow the necke towardes the Anterior partes. And note that these last recited Muscles are sometime (though that very seldome) knit vnto the hinder part of the head, or *Occiput*, where the hole is, through which the Spinal narey descendeth.

The second beyng large and fleshy, springing from the first ribbe, but ascending, 13. iij. becom-

The arme turned aboue by the first, sece, and seventh Muscles of the shoulde. Velat. 2. Cap. 23.

What is meant by shoulde as also in the history of bones is not omitted.

The Muscles of the head. The head is moued with a first and secondary mouyng. The proper mouynges of the head.

The fall of Galen. Col. Lib. 5. cap. xij.

The number of the Muscles to the proper mouyng of the head.

Why nature appointed so many Muscles to the drawing of the head backward.

What Muscles doe make a crosse in the head.

The secondary mouyng of the head. The Muscles of the necke. Their number.

The Muscles lurking vnder Æsophagus.

becommen so narrow as that they fashion not so much as a triangle. They are supported by the transuerse Processes of the Vertebres of the necke in the Anterior part.

1. The thyrd payre hath his originall from the rote of the transuerse Processes of the vi. Vertebre of the brest, and ascendyng bywardes also from the other transuerse Processes of the Vertebres of the necke, in y posterior part. Their office is the like with the second before named, that is, to bow the necke directly to the shoulder blades, or sides: as when both of them moue at one tyme: but onely, styreth it obliquely. Betwene these two Muscles go forth the pterues, produced from the Spinnall marrow, betwixt the Vertebres of the necke.

4. The fourth begynnynge at the vij. Vertebre of the brest, goyng aboue all the ridge or Spines of the brest, and necke, do at last end at the Spine of the second Vertebre of the necke, and ordained they were to the drawyng of the necke to the posterior partes.

N Ext now followeth the backe, which is moued with diuers motions, and (generally) that is foure simple: as flexion, extention, and inclination to the right, and left side. To the atcheuyng of which motions it behoued that nature created viij. Muscles. That is foure on ech side.

The first come from the superiour cavitie and the posterior part of the bone *Ilium*, as also from the superiour, but interior part of *Os sacrum*. Their begynnynge is broad, and fleshy, ascendyng in the inner part of Abdomen, and cleaue to the transuerse Processes of the Vertebres of the loynes, and to the lower ribbes: they are all fleshy, and in figure foure square: and when both of these moue together, they can bow the backe forward, but feuerally laboryng, do draw it to a side.

The second Muscles are longer then all the Muscles of our body. For they are extended from the lower part of *Os sacrum*, even by to the head: their originall is from the extreme part of *Os sacrum*, with a finelwy begynnynge and strong, then after degenerate into fleshy, and cleaue to the transuerse Processes of the Vertebres of the loynes, towardes the posterior part, afterwardes to all the transuerse Processes of the Vertebres of the brest, even vnto the first, to all which transuerse Processes they send a tendon or finelwy hold, in which place *Vesalius* supposed this Muscle to end, but departyng from those Processes and ascendyng aboue the Mammillar Processe, it endeth in the temporall bone: which part *Vesalius* reckened amōg the Muscles of the head, albeit thus *Collumbus* accompteth it to y second payre of the backe, nether are these made without vse: but bolue the whole backe and head also to the posterior part, whereby the body may imitate the figure of a halfe circle.

3. The thyrd Muscles spryng from the posterior part of *Os sacrum*, begynnynge sharpe, and are knit to the ridge of the Vertebres of the loynes, and sharply also end in the ridge of the xij. Vertebre of the brest: though sometime in the xi. furthermoze they are endewed with finelwy holdes, as before in the other, and they are authorized to bow the loynes.

4. The fourth likewise hauyng a sharpe begynnynge, spryng from the ridge of the xij. Vertebre of the brest, and are fastened to all the Spines of the Vertebres of the brest, and sharply also end in the first: beyng broad in the middelt about the vi. Vertebre: and haue power to erect the brest. And when the thyrd aforesayd do labour together, they hold straight all the whole backe. But if foure styre together, as one would follow an other, they moue it in compassed sozt. And the Muscles mouyng that be onely on one side, the body then is turned to a side.

The thyrd Muscles are of the loynes, which the Grecians call *ψαλ*, the thre last are annered much vnto them, whereby it cometh to passe, that if the Anathomist

mist be not excellent diligent, they are neither easily found, nor distinguished.

N At naturall but voluntary (sayth Galen) is the respiratiue motion. The brest therfore is a part within hollow like an egge, wherein are put the instruments seruing to life, and consequently to respiratio, and inspiration: with out the which the life it selfe by no meanes could exist, or stand. But (contrary to the aforesayd Authour) this moueth by nature, aswell as by election or choise: as for example when we sleepe, the sure of nature the brest moueth, and not of will, to the which purpose, betwene the ribbes & brest bone are Cartilages put, which easily geue place to the naturall mouyng of the lunges: which cease not of their labours, whether the body sleepe or wake. Besides, when we fallie or call, then they are moze largely moued, because the brest by the Muscles is also moze dilated. Of these motions the voluntary is made by Muscles, but the other onely by dilatation and constriction of the lunges. Therfore to this end there are of proper Muscles 81. and 8. common. Which although they be put in Abdomen, and ferue therto, yet are they seruicable to the brest also. But heare by the way a notable thing, when we inspire or let in brest, the lower partes of the brest are then dilated, and the vppermost compressed. Contrariwise whilst we expire or bresthe the nether partes are constringed, and the vppermost dilated.

Of the Muscles of the brest the first two that come to hand, that is on ech side one, are produced in the begynnynge from the inferior part of the Camell bone, and with a long end are inserted to the superiour part of the first ribbe: which they serue to dilate.

The second Muscle is great, broad, and all fleshy, begynnynge at the scate of the scapule bone, and goyng betwene it and the ribbes is inserted in the first, second, thyrd, fourth, fift, sixt, seuenth, and eight ribbe, and somewhat to the ix. neare vnto the borders of the Cartilages. The endes of this Muscle are lyke vnto fingers, and was made to dilate these viij. ribbes.

The thyrd is a small one, comyng from the Spine partes of the thre last Vertebres of the neck, and first of the brest, in the begynnynge broad and Membraneous, but endeth at the first ribbe of the brest and sometime in the posterior part of the fourth. And thus was it made of nature to dilate those ribbes.

The iij. Muscle is also small and iij. square, brought from the Spine of the y. last Vertebres of the brest. And sometime fro the first of the loynes. In the begynnynge it is broad, finelwy, & Membraneous, but after becommeth fleshy, & endeth in the iij. last ribbes, after the maner of fingers: so can they dilate those ribbes.

The fift carneous, riseth from the hynder, and vpper part of *Os sacrum*, and from the inner part of *Ilium*, cleauing so fast to the second Muscle of the backe, as it may be thought a portio therof. Neuerthelesse when it cometh to the ribbes, it sheweth playnly it selfe to be diuerse from the Muscle of the backe. The higher it ascendeth the slender it wyreth, beyng at length inserted by the stay of finelwy holdes, to all the ribbes in the posterior part, not far from the transuerse Processes of the Vertebres, where the ribbes haue their eminent asperities. These partes constraime and bynde together the hinder partes of the brest.

The sixt is put within the hollow of the brest all after Sternon, and the viij. Cartilages of the true ribbes, it is fleshy, long, and but small: to this vse ordained, that is, to straiten the anterior partes of the brest.

A fter followe the intercostall Muscles, so called, because they occupy and possesse the space places betwene the ribbes, and are on ech side foure and thirtie. For the spaces be xi. vi. of the true ribbes, and siue of the false ribbes, ii. in the spaces of these, and foure in euery one of those. This difference makes, that the Cartilages may be turned towardes the brest. In these Muscles the course of the Fibres is turned. For the outer and inner haue oblique Fibres but in contra-

Q. i.

12

Of Muscles moving the brest. The description of the brest.

The brest hath body naturall and voluntary mouing. When the brest moueth naturally, when the brest moueth voluntarily.

What maketh the voluntary mouing. What maketh the natural mouing. The proper Muscles of the brest are 81. the common 8.

In Inspiration inferior partes of the brest are dilated and the superior constringed.

In expiration contrarywise.

The first muscles of the brest.

Vesalius, cap. 3. 8. The Muscles of the backe. Col. lib. 5. cap. 19. The number is viij.

Their vse.

How the body is bowed like a half circle.

The vse of the 4. Muscles of the backe.

When the whole body is turned to a side.

The thre Muscles called Mammillar in the backe.

2.

5.

4.

3.

6.

The Intercostall Muscles are on each side 34.

ry sort, for the outer and inner make together the figure of this letter X.

The beginning of the exterior Muscles is from the lower part of the ribbes, and end in the upper partes of the next following, so that beginning towards the backe, they end at length in the breast bone.

But the inner begin from the upper part of the lower ribbes, and end at the nether part of the superiour ribbes.

The Fibres of the exterior Muscles procede from the backe, slopwise towards the breast, as it were from above descending, but in contrary manner be the Fibres of the interior Muscles, so that they ioyne, and mete together like crosses.

*Vesalius* hath written that Nature made these xxiii. Intercoastall muscles on either side and all to one end and straitning of the breast. But for that he goeth not vntouched of *Columbus*, who proueth how also they can dilate the breast: that is when either the interior or exterior separately worke alone. But in deede when all moue at once, then they coast, and make strait the breast strongly. For the exterior pull vpwordes, and the interior downewordes so drawyng, and constrainyng them very hard together. For so ought the force of contraction to be strong, beyng oft forcibly put in by sodaine efflation, speech, and vociferation. The same Authour inferreth also by what meanes *Vesalius* was deceived. For (sayth he) he supposed in this motion that the first ribbe remaineth not moued. But the matter is playnly otherwise. For it is styred by the first Muscle of the breast, which springeth from the Cannell bone: so that when it is lifted by, it draweth the ribbes after in order: whereto the Intercoastall muscles are assistant: and so they are outward extended, the exterior Muscles helppng them: but downeward contrarily by the helpe of the inferiours. For because the last ribbe is drawne downeward by the oblique ascendent Muscle of Abdomen: And after this order aforesayd they are dilated. Notwithstanding when that both do worke together, that is the outer and inner, then followeth constriction of the breast generally, as somewhat before is written.

There is yet an other Muscle common to both sides, which the Grecians call *ἰδιαπνευμα*, the Latines *Septum transversum*. This divideth the vitall from the naturall partes. Aristotle beleued this diuision to be made of nature, to the end that the vapors of meates and substance receiued, might not ascend by funnes to the hart, and annoy the same. But that opinion is altogether ouerthrowne by *Columbus*. For as touchyng that matter, if *Septum transversum* were away it forceth not, since the meate hath a close entraunce, and passage into the Ventricle, neither may it by any meanes send, or let passe vapors to the hart: for the substance of the stomacke is not so light and spongy. Agayne if it might, it appeareth the hart should not be offended at all thereby, seyng (for prooue) in byrdes, and diuers creatures, it is naturally wantyng. But to the purpose.

This Muscle differeth from all other in the body both in situation, forme, and noblenes: In situatiō, as lying ouerthwart the lower part of the breast: In figure, beyng round compassed, hauyng in the midst a sinewy tendon, compassed about with fleshy partes, and dispersed with Fibres from the midst round about, as a thyng most comely to behold: the noblenes thereof is such as beyng wounded, the partie seldom, or hardly escapeth. And it is sayd that the auncient Anatomistes and Grecians called it *Phrenes* whiche is by interpretation the mynde. Plinie, and others after him named it *Præcordia*.

But besides the sinewy tendon, which before we haue spoken of, and whereby it is partaker of much sense, it possesseth also both Veynes and Arteries, & those not small, but large.

Do lesse moreover obtaineth it the sortes of diuers Perues, whiche betwene the spaces of the ribbes do come vnto it from the Spinall marrow. Among which are

are ij. comyng downe from betwene the fourth and fift Spondill of the necke are solen about *Pericardium*, where the fleshy part of *Septum* doth degenerate into a Tendon, or rather where the tendon endeth at a fleshy nature.

*Euchysius* not in vayne (as it seemeth) describeth therein two circles, which are thus: the middell beyng *Membraneous*, & the outer partes which copasse that same more fleshy. And as it is the nearer to the ribbes & more fleshy, so & nearer to the centre of middell, so much the more *membraneous*. In which wordes he meaneth not any diuision therein, but onely speaketh of the middell and outward partes: as the one more *Membraneous*, & the other more retaining of a fleshy nature.

Moreover this Muscle of the breast ministreth both to expiration and inspiration, that is, puttynge forth the breath, and receiuyng it in. Who in vsing this his proper naturall function withdraweth him selfe towards the Vertebres, and ascendyng, draweth to him the extreme partes of the breast, and byndeth together all the inferior part: all which effect it worketh whilest we expire, or breath forth. But when we receive in the breath, it taketh a cleane contrary labour in hand: for then beyng relaxed, and saggyng downeward, it suffereth the inferior partes of the breast to be dilated. And this is the notable vtilitie of *Diaphragma*, as the same Authour reporteth to haue beholden in quicke dissections.

Wherby very fitly (methinks) it may be supposed, that whilest in retaynyng the breath it declineth downeward, the holdyng or straying then of the breath receiued, compresseth it hard vpon the subiect partes, very forcibly therewithall compellyng the expulsive facultie: as when we draw together the bellye to the expulsiō of excrementes, we cannot fitly accomplishe the same onely by straying the lower partes, but by enlargyng the breast, and compressyng the middeil together with forcibly retaynyng of breath. By whiche meanes *Diaphragma* thrusteth vpon the lower partes: to the end, that in straying the nether bellye by the assistance of the strong Muscles of Abdomen, none of the intrels might seeke to haue scope or recourse vpwordes, but altogether consentiue forcynge one an other downeward, to make a most strong, and certaine exclusion of the superfluous degges of the thyrd digestion.

To the better confirmation of this my coniecture *Fernel. Ambian* hath these wordes: The middeil called also an ouerthwart diuisiō, and a girdle to the body, besides that it is the first instrument of inspiratiō, it helpeth also very well to the unloading of the belly, and byrning out degges.

This Muscle is clothed both above and beneath as with a garment: above with *Pleura*, and beneath with *Peritonæum*. It springeth from the Vertebres.

Others esteeme the sinewy part to be the beginning thereof. Notwithstanding *Columbus* ascribeth the beginning thereof vnto the ij. little long partes thereof, which *Vesalius* calleth Ligamentes, which little bodies, come from the side of the body of the xij. Vertebre of the breast, and from the upper ioyntes of the loynes, and from thence afterwarde both the sinewy part take his beginning, which is ioynted to the Cartilage, called *Gladialis*, or commonly *Mucronata*. Which in the History of Cartilages is fully described: beyng begotten as a propugnacle to this aforesayd Muscle, but not to the mouth of the Ventricle as the common crew of Philosophers do suppose. And to this part also the hart lyeth.

Finally the middeil is fleshy on both sides, and is implanted at length to the Cartilages of the false ribbes, embracyng the last.

*Vesalius* hath affirmed the perforation of this noble member to be made threetyne. And it is certain, that it yeldeth way to the transiture and course of other needfull partes, for the communion of the vitall with the naturall, and the naturall with the vitall members. Yet it is but twice pearced, or boored thzough, as once by the hollow Veyne, which forthwith marcheth into the breast: and the se-

*Euchysius* Ibid. & the circles of *Septum*.

*Col. Lib. 5. cap. 21.* *Septum transversum* ferueth both to inspiration, and expiration.

How *Septum transversum* assisteth to the exclusion of excrementes.

*Fernel. Ambianus. Cap. 8. de Partibus Ili.*

*Col. Ibidem.* The beginning of *Septum transversum*.

*Mucronata Cartilago.*

The perforations of this noble Muscle. *Col. Lib. 5. Cap. 21.* *Septum transversum* is not thrice pearced against the opinion of *Vesalius*.

The outer Intercoastall Muscles.

The Intercoastall Muscles on the inside.

The error of other anatomists in the use of the intercoastall Muscles manifested by *Columbus*.

Why the contraction of the breast ought to be strong. The cause of the error of *Vesalius* in the use of the intercoastall Muscles. How the ribbes are moued.

*Diaphragma* or *Septum transversum*.

The false opinion of Aristotle.

*Tab. 5. cap. 81.*

The Muscle *diaphragma* how it differeth from all others in the body. Situation. Figure. Noblenes.

*Euchysius. Lib. 2. cap. 21.* *Phrenes*.

The partes entering into *Septum transversum*.

cond tyme, by the stomache, or necke of the Ventricle called also *Esophagus*, wherewith likewise do descend two *Perues* from the vi. payze of sinewes of the bryne. But the iourney of the great Arterie perfozateh not this Muscile: for as much as whilest it ampleteth the Vertebres, it embzaceh it also, but therfore maketh no hole. To this end (therfore) *Euchsius* sayth that the way of the great Arterie deserueth not the name of a hole, but rather a halfe circle carued out of the compassing part of the midzief, that is when it embzaceh the inner side of the Spondiles, there lying the way of the same great Arterie, called in Græke *σπινδα*, and not the same hole where thzough *Esophagus* passeth. For stat agaynst that lyeth the testimony of veritie, had it bene the sentence of *Socrates* him selfe, as it was of *Hipocrates* and *Galen*: though no man can say they were men of no Diuine vnderstandyng.

Thus *Septum transversum* is accounted amōg the Muscles of the bzeft, wherby is shewed how much, and of what efficacy it is in respiration.

But so much as is sayd in that behalfe, tendeth to the sence of naturall respiration. For whatsoeuer is vehement, or violent, the same is contrary therto. For if to the qualitie of the heate of the hart do encrease, or occasion serue that, for the speech, or other lyke, larger bzeathyng is required, then els could well suffice nature, by & by the first, second, thyzd, fourth, and fift, together with the interior muscles called *Intercostales* on both sides, do labour w<sup>th</sup> *Septum transversum*. But if further by bodely causes or sodaine occasion, great and larger respiration be required, as for example to the vse of hollowyng, crying, blowynges of trumpets, shalmes, or other vehement efflations, then the exterior *Intercostales* are prouoked to mooue, which be motions not naturall. For naturall respiration is that which is brought to passe without the helpe of the *Intercostall* Muscles, and that is it whiche this woorthy member sufficiently bzyngeth to passe: and whatsoeuer is more, the same hath more helpe, and is naturall, but rather we may terme them necessary for seruyng at nede full tymes.

As to be playne, this is not naturall, but a very necessary kynde of respiratiō, when a man by earnest study or muse vnto him selfe, vpon any earnest or waighy matter, by tossing and turmoyle of his wittes, with continuall inward cogitation of the hart, accenseth and heateth more the spirit then naturall respiration is able to temper: then he at a sodaine maketh a vehement inspiration, and after as large efflation, which with indifferent intermission, proueth profitable to coole the kindlyng heate of the hart: a more vehement then that is proued in trumpet, fozs, pypers, hunters, and such lyke exercises. And therfore necessary, though not accounted of *Galen* naturall. Whiche argueth that nature hath created our bodies so carefully, that whatsoeuer is either naturall, or necessary, it is not wantyng. Wherfore these Muscles *Intercostales*, little vsed in naturall bzeathyng yet not to be wanted in extreme efflations, prouoked by nede full causes such as are rehearsed. It is not obscurely proued by this afoze goyng, that the nobleness, and woorthy nature of this Muscile may euill be spared in mans body, both for the naturall vse of respiration, as also eiection of excrementes, and it beyng wounded the hart smolozeth, like the lampe that dyeth for lacke of oyle.

The Muscles of the lower belly, that is of Abdomen, wherein are contained & nutritiue and generatiue partes, are in nūber viij. addited to the vse thereof, although they helpe the bzeft, in dilatyng the same. But if they compresse and strayne together, then serue they to the expulsion of chyldbirth, vyne, and excrementes, chiefly by the helpe of the last Muscile described. And these viij. Muscles lye iij. on oche side, and are thus namely distinguished, iij. oblique, two straight, and two transuerse or onerthwarte, and of the oblique two are ascendent, and as many descendent.

The ij. first to be described are the oblique descendentes so called, for that their original is from above, and end obliquely, or slopwise in the inferior partes, their Fibres running the same race: therfore are they called oblique descendentes, beyng broad, and situated in the side partes. They issue forth from the first, seventh, eighth, and ix. ribbe, before they begyn to end in a Cartilage, and further from the ribbe following, and the toppe of the transuerse Processes of the Vertebres of the loynes, and from the halfe of the Appendaunce of *Os Ilium*: they haue most broad begynnyng and fleshy, set out like the fastio of fingers, betwene which endes the second Muscles of the bzeft do enter, which dilate the viij. ribbes. But after they haue gone a good space forwarde, they degenerate into a broad, sinewy, and Membranous tendon, which cleaueth to the other part of the Appendaunce of *Ilium* and *Pubis*: *Euchsius* sayth in the hucke bone, but *Collumibus* holdeth that opinion as false. In the middelt of the belly they end, that is to say from *Mucronata Cartilagine* directly downe to *Os Pubis*, in which place, is to be discerned the white lyne, where the tendons of these Muscles together with the oblique ascendentes, & the transuerse are ioyned together. But this part therfore becometh white because there lyeth no fleshy vnder it. Wherfore y<sup>e</sup> white line is the end of these afoze sayd Muscles sayth *Realdus*, although *Vesal.* hath certified a nūber that their insertiō should be in *Os Pubis*. But such is their vnion of their tendons, as it seemeth to be onely one Muscile haupng iij. fleshy partes. But if any man diligently marke the end of their Fibres, he shall playnly finde the ij. Muscles knit together in the middelt, and lying above the other five Muscles of the belly.

The second are the oblique ascendentes, whose Fibres are coursed in contrary sort in respect of the first: for those runne downward, these obliquely vpyward, and like as is sayd of the Muscles *Intercostales* they crosse one another, making the figure of this letter X. These spring fleshy from the Appendaunce of *Os Ilium*, and at the transuerse Processes of the Vertebres of the loynes, in the begynnyng like a Membran, and going vpywardes fleshy, as knit vnto the lower ribbes. Then afterwarde end in a broad, sinewy, and Membranous tendon, which in ascendyng, as it cometh to the straight Muscles, denideth in two, wherof the one goeth above the straight Muscile, the other vnder it: wherein the policie, and wonderfull wise doome of nature is able to astonishe mans myndes. For the straight muscles, by beyng embraced betwene these two, are made by that meane stronger, and in the middelt of iij. are constituted. And vnto this sayd tendon had bene so denided, the strait muscles in no wise could haue bene placed in the middelt. But these Tendons are vnited together agayne at the white lyne, and here doe end after the same maner, as did the descendentes cleauyng to the sinewy partes of the straight Muscles. The office whereto the ascendent and descendent Muscles do serue, is to compresse and strayne the intrelles, as also by drawyng the ribbes downwarde, to dilate the bzeft.

The iij. Muscile of Abdomen are these, called the strait Muscles, because they lye after the reatitudo, and length wayes of the body, being replenished also with straight Fibres. The sentence of *Galen* as touchyng the straight Fibres is denyed: in that their begynnyng (sayth he) is from the bzeft, which in dede was of latter tyme proued to be from *Os pubis*, hauiyng y<sup>e</sup> beginnynges for the most part, the one sinewy, the other fleshy, from the vpper part of *Pubis*: neuertheless som tyme they haue but one fleshy begynnyng. They are ended in Sternon, and in the Cartilages of the last trew ribbes, with a broad endyng, without tendons: yet haue they thze tendinous, and sinewy intersections, whereto the ascendent oblique Muscles cleaue. And these diuisions *Galen* in no wise hath marked, although they were made greatly to strength these Muscles, lest that they should be too capely drawen into Abdomen. To the end y<sup>e</sup> belly might be left more round they

The ij. first Muscles of Abdomen called the oblique descendentes.

*Euch.* lib. 2. cap. 22. The course of *Euchsius*.

*Col.* libidem. *Vesalius* responed by *Collumibus*.

The second ij. Muscles of Abdomen called the oblique ascendentes.

The straitest arte of nature.

The vse of the ascendent and descendent Muscles.

The third Muscles of Abdomen called straight. *Gal.* vi. part. lib. 5. lib. 5. de Anat. ad. *Col.* libidem.

The vse of the intersections of the straight muscles.

*Lib. 1. Cap. 22.*

*Articuli Aorta.*

The fall of slipp, and Galen.

*Galen* Lib. de Mot. Musc. viii. 10.

*Septum transversum* is onely y<sup>e</sup> arthop of naturall respiration.

Naturall respiration.

Efflation.

The midzief wounded, death ensueth.

*Gal.* lib. 5. Anat. ad. *Vesal.* lib. 1. cap. 1. *Col.* lib. 5. ap. 22. The Muscles of Abdomen.

Number.

The

2. iij.

they



they are in rising very neare together, but the higher they ascende, the further they are separated. Them also being sufficient thicke, and strong, nature made to the compression of the Anterior partes of Abdomen: although more evidently they draw the best downward, to dilate it above.

The last are called transuerse or ouerthwart Muscles, because ouerthwartly in the body they take their places. They come sinewy from the transuerse Processes of the Vertebres of the loynes, although afterward they go forward fleshy, and hauing likewise transuerse Fibres, are coherent to *Os Ilium*, and the lower ribbes. But finally their end is at a broad, sinewy, and Membranous tendon in the white lync, and cleauing to *Os Pubis*, as the oblique ascendentes, and descendentes, though not so adherent. So do they cleave to *Peritoneum*. Their ducty is to compresse the belly, and bynd together the Hipogunder.

Furthermoze you ought to note that the tendons of the oblique descendentes, and of the transuerse Muscles are perforated. First, at the nauell, secondly neare to *Os Pubis*, and through those holes do descend the vessels preparing side to the testicles, and do ascend the vessels bringing side called *Deferentia vasa*: which at last are settled into the *Glandules* called *Parastata*. And these be the holes by which the ruptures happen.

Thus the viii. Muscles of Abdomen, besides the common vse of Muscles which is to warme the body, are propugnacles, and defences to the subiect partes, and helpe the motions of the best by their first vse. For if the oblique ascendentes be stretched, in compressing the lower state of the best, they do streiten the same. But the straight, together with the oblique ascendentes, whilst they draw downward the ribbes, they bynd the best together not a little.

The ouerthwart, or transuerse Muscles do bowe inward the ribbes, thereby to straighten the best. Scruping also to the body most notably, for the expulsion of hard excrementes. But when all of them labour together, the midreife also by by retaining of the best being depressed, they to constrain, and presse the intrels together, as out of a strait place into a larger, whiche is lower, they thrust and expell the breeches, wholly resistyng their returne agayne into the Ventricle. And as touchyng generation of voyce, great efflation, restrainte of breath, and propulsion of the breath in women, nature receiveth by them a large benefite.

But here perhaps some (onely Englishmen) will object, that I leave out the principall properties of these Muscles: in that they retaine such worthy faculties as to attract, retaine, and expulse. In dede I confesse that our manner sort of Chirurgicals, who are not able to dispence with the Latine Authoz, haue learned to many such phantasticall imaginations of sundry Englishe woordes, which heretofore haue bene Imprinted, whose authozs whence they drew their labours for the most part, are not comparable to the founders of this building: and albeit their good willes were commendable, yet this much must I needs say, if all of them had sweat moze in the woordes of Gal. in his administration of Anatomy & vse of partes, their woordes had not at this day remained so reprehensible, although Galen we see himselfe, was in Anatomye now and then deceived.

But I much maruaile whence they toke this sonde opiniõ, that the straght Muscles made the attractive power in the body, the transuerse the retentive facultie, and the oblique an expulsive operation. Which singulare offices, euery of these should orderly baire vnto the body, without any other cause of their creation. And namely *Gemini*, after he had thus fallen vpon him selfe, immediately is about to alledge Galen for his purpose otherwise, who if he had folloved in this paynt, he should haue missed to commit this so great an error: For else Auicenna, who in this poynt is agreable with Galen, as appeareth in his Chapter of the Muscles of the belly. Wherefore I aunswere, that for as much as no worthy writ-

ter would baire me out therein, except *Mundinus*, whose woordes are generally affected with error: I willingly, by thy patience (gentle reader) do abstaine from such an infamous kynde of description. And if thou desirest somewhat to reason with me, I shouldest say: why is it not likely that the straight Muscles, lying after the rectitude of the body, should make the power attractive, whereby the contraction made in the stomacke, and put forth into the intrelles, is drawne downward till it be deined by the mecerall beynes of all the best inyce, and afterward the refuse gathered to the lower partes, by being still drawne downward, till nature be ready to eie them? So likewise, the transuerse do retayne, and hold backe, till nature haue done to them her kynde and office of digestion, and that to euery part be geuen his dutie: Agayne, that the oblique haue expulsive propertie, which is to put forth, and expell such thynges as nature commaundeth and prouoketh to be done?

I aunswere vnto the briefly, that as the Ventricle hath oblique Fibres to retaine, so also transuerse Fibres to expulse the digested matter, which being *Chylus*, thinne, and flowyng sayth *Collumbus*, runneth easily into the spaces and empty partes of the intrels, which is by the transuerse Fibres comprehended as with handes. In the meane time nature is not idle, but lest it should escape by the subtilenes therof, and slippernes of the intrels, beside the office of *Vena Chilis*, fetcheth it in by the notable texture of *Mesenterium*: so that finally all the good inyce is drawne from the best, the ponderous waight wherof cannot stay in the slipper substance of the intrels, though the straight Muscles of the belly had not bene. As touching the retentive facultie, whereby ech thyng should be kept till nature were otherwise willing, aunswere me to what end the oblique Fibres both in the Ventricle and intrelles serue: as also so many turnes, and wyndynges of the intrelles.

How the expulsive facultie is made, I haue already fro Galen, Vesalius, and Fuchsius largely described: or (in a word) it is mightily brought to passe by the constrainynte of all the Muscles of Abdomen, *Diaphragma* also depressed.

And this is inough, that the Muscles of Abdomen in falsifying their natures, be not robbed of their due offices. But before I go forwardes with any other partes, I thought good to say thus much out of *Collumbus*, as touchyng the inuention of moe Muscles then viii. vnto Abdomen.

There are some Anathomistes of my tyme, who being desirous them selues to inuent some thyng, do constitute Muscles to Abdomen, but certainly they are deceived. For they would haue the fleshy begynnynge of the straght Muscles to be a distinct Muscle, which by no meanes can be: for if they should be Muscles as they say, some office must needs be applyed vnto them. As that they are assaunt to the erection of the yard, which they can not do because they cleave not to it, but are fastned to *Os pubis* above. Agayne if the yard were by them to be drawe byward, so must likewise the shape of women be: fence in women they are seene no otherwise then in men: neither hath *Vulua* voluntary mouyng: they therfore haue inferred, that by them the straght Muscles are ayded, which beareth truly no otherwise then the rest. For so strong are the straght Muscles of Abdomen, that they neede no helpe: and in that they will haue their Muscles to compresse the bladder, is all one thyng: for the bladder by all the viii. Muscles is compressed, which onely they would attribute vnto the offices of these.

But there follooweth an other no lesse absurditie, in that these fleshy begynnyngs, which they call distinct Muscles, are not found in all men: therfore belike such persons should wat their vtilities, for which they would haue the sayd Muscles be begotten. Which is a playne ouerthrow of all their bayne inuentions, therfore sayth he in conclusion, it is a bayne saying that they hold of the Muscles of

The cause why the authoz waterth not these offices to the Muscles of Abdomen, Madmus Anatomie for the most part ouergrown with error.

Thus Reader thou hast bene taught heretofore by Gemini.

Col. Lib. 1. Cap. 4. The constitution.

The Muscicall Welnes of Mesenterium.

The Muscicall Welnes of Mesenterium.

The Muscicall Welnes of Mesenterium.

The Muscicall Welnes of Mesenterium.

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The Muscicall Welnes of Mesenterium.

The Muscicall Welnes of Mesenterium.

The Muscicall Welnes of Mesenterium.

The transuerse Muscles of the belly.

The vse of the transuerse Muscles.

The perforations of the Quilles of Abdomen. The vessels preparing side to the testicles, and do ascend the vessels bringing side called Deferentia vasa: which at last are settled into the Glandules called Parastata. And these be the holes by which the ruptures happen.

Col. Lib. 1. Cap. 4. Part The vse of the Quilles of Abdomen.

Fuch. Lib. 1. Cap. 22.

Galen Ibidem.

The vse of the muscles of Abdomen according to our English writers before tyme.

The authozs of this history commended. Galen sometime sayed in 8 partes of many body.

Gemini the patient in this case.

Auic. Lib. 1. Cap. 22.

Col. lib. 5. Cap. 23.  
Of the Muscles  
of the testicles.  
The Membran  
called Dartos.

The Muscles cal-  
led Cremasteras or  
suspensores.

The use of these  
Muscles.  
Col. lib. 5. de femine  
cap. 27. uch. lib.  
2. cap. 30.

Col. lib. 5. Cap. 24.  
The lower Mus-  
cles of Penis.  
Vid. lib. 2. cap. 50.

Their use.  
Col. lib.

The other Mus-  
cles of Penis.

The use of the  
last Muscles of  
Penis

Of the bleedar,

The Glandules  
called Parafutis do  
conterpene febre.  
The muscle com-  
plecting the necke  
of the bleedar.

The orrow which  
our running cut-  
ters for the most  
part committe in  
taking away the  
stone.

uch. lib. 2. cap. 31.  
Lib. 5. 6. part.  
The use of this  
Muscle.

1.  
2.  
3.

Col. lib.

Abdomen, and may in no wise be defended. But hether to sufficient.

**I** followeth to speake of the testicles, and yarb. Query of the testicles refat-  
nyng one Muscled, long, and slender, situated in the Membran called in Græke  
Dartos. Their beginning is about *Os pubis*, where the hole is apparant through  
whiche the *Seminarie* vessels descend, entwapped with the same Membran, yet  
do they scant imitate the true forme of Muscles, but are certaine straght fles-  
hy Fibres put in the same Membran Dartos. The auncient writers haue cal-  
led these Muscles *Cremasteras*, as it were *Suspensores* or hangers by: made as it  
seemeth, that the testicles should hang by them, and not sodainly slippe downe.

By the helpe of these Muscles the testicles of man are by litle and litle obscur-  
ly drawne by, least by ouer slacke or lose hanging downe, the *Seminarie* vessels  
should be overlooded. But the foresayd use of these Muscles are most notable pro-  
ued in the Acte of generation. For if alway the testicles should draw downe, and  
load the *Seminarie* vessels to the perpetuall coarctatio of their passages, they could  
not so properly circulate the matter of generation, as when the waight beyng su-  
bleuated by the attractio of these Muscles, their passage is made more easie & open.

**T**he yarb beside his substance, and y thicke Membran which entwappeth it,  
hath foure Muscles. Of which the y, first haue their beginnynges from the  
orbicular, or round compassed Muscled, which lyeth at the extreme end of *Test. into-*  
*stimmus*. they are neare one to another, & with their inner sides toyne mutually  
together, beyng planted to the vinary passage: whereas beyng in them selues  
deuided, do as it were embrace the body of *Penis* like fingers. And beyng thinne,  
are made to this use, that whē sēde or vīne should be put fourth, they then might  
open the way.

The other y, Muscles rise from the appendaunce of the huckle bone vnder the  
rising of *Penis*, which taketh his beginning from the inferior part of *Os pubis*.  
These Muscles are short, but thicker then the aforesayd, and end in the body of  
*Penis*. Whiche as they are also ayding to the course of *Vrine*, so much more they  
proffit in the tyme of coiture, sustayning, and holdyng the yarb erected, untill the  
whole act be finished.

**A**t the end or necke of the bleedar, in man groweth two Glandules or ker-  
nels called *Parafutis*, which are alway, except in children, old men, & such  
as be consumed by leaneesse, full of sēde. In the end of these Glandules is put a  
thinne, round, compassing Muscled with circular Fibres, which serueth to bynd  
together the necke of the bleedar, lest the *Urine* at any tyme agaynst our willes  
should issue forth. For were not this Muscled, the *Urine* every houre would an-  
noy vs, as it chaunceth to them, in whom the same is relaxed: as also to such,  
in whom the same by wicked Emperickes professyng to take away the stone, is  
cut ouerthwart, who, of the situation hereof beyng altogether ignoraunt, do in  
steade of takyng one grief away, induce manifestly an other disease, whiche is  
most filthy and lothsome.

*Leonardus Fuchsius* maketh this Muscled seruiceable to thre notable uses, the  
last wherof he taketh from Galen. One is to shut the Orifice, & necke of the blad-  
dar. The secōd to leaue nothing in the Vinary way: for when the *Urine* is gone  
forth immediatly this Muscled plucketh together, and draweth out the rest of the  
*Urine* that remaineth in the way: as commonly there are y, or y, droppes that  
go forth after the flowyng of y *Urine*. The thyrd, which Galen witnesseth to, is  
for the promptitude and swiftnes of excretion or makyng water, yet not of that  
whiche is in the bleedar but that which is already in the Vinarie passage: nei-  
ther so swiftly (as now) the bytyng *Urine* could passe through the Vinary way,  
had not Nature placed round about the exterior part of the same passage this  
Muscled: so notably seruyng to his use.

The

**T**he extreme end of the straght intrell is called the Fundament, endued for  
his proper uses with y, Muscles, one, whiche prohibiteth ech vntymely  
and involuntary egestion of excrementes, and other y, which speedely plucke by  
the end of the straight intrell, thrust forth before by egestion.

One of them therfore is round, compassing about the end of the straight in-  
trel called *Sphincter*, and beyng broad and thinne, containyng ouerthwarte Fi-  
bres, is much united together with the thinne and Ligamentes received from  
the tayle bone, and this is comparable to that of the bladder, whiche preuenteth  
vntymely excretion. The other y, are also broad and thinne, beginning from the  
Ligamentes of *Os sacrum*, and from *Ilium*, and endyng in the upper part of *Sphinc-*  
*ter*. These in like sort are ordayned of nature to draw by agayne the straight in-  
trel, lest it should go out in such as straigne them selues, as neuerthelesse in  
some sometyne no doubt it fortuneth.

**D**uers and sundry, great, and necessary motions are appertayning to the  
thighe as to extend, to bolve, to moue toward the other legge, agayne out-  
ward on the side, & to turne about with a compassing motion. The thigh therfore  
(saith Galen) is bolued towardes the flanke in lifting the same upward, & exten-  
ded in setting the same direly to go on the earth. But the chiefest extensio therof  
is whilest we stand, to the whiche action nature hath geuen many, and strong  
Muscles. But the nūber of the Muscles seruyng to the actions of the thighe is r.  
great, & strong, as it was behoofull to the mouyng of a member so thicke and long.

Of these the first is that Muscled that doth constitute the haunches, sufficient  
thicke, and fleshy: springyng from halfe the Appendaunce of *Os Ilium*, from *Os*  
*sacrum*, and *Coccx*, it hath a broad and halfe circled beginnyng. Neuerthelesse  
becommyng alway narrower and narrower, it ceaseth at length at a sharpe end,  
whiche is committed to the greater Trochater, and going lower in the thigh, lyeth  
vpon the ioynt of the hippe with a broad tendon.

The greater part of the second Muscled lyeth vnder the first, beyng somewhat  
blacke: it springeth from the whole Appendaunce of *Ilium* with a fleshy, & halfe  
circled beginnyng, it runneth vpon the same ioynt also, and endeth at a broad  
and strong tendon, which cleaueth to the toppe of the great Trochater or Proceffe  
of the thighe, and embraceth it.

The thyrd Muscled of the thighe lurketh vnder the second whole, beyng also  
blacke, and beginnyng fleshy, and in circle wise. It goeth from *Os Ilium*, and as it  
sayd of other two in his progresse it diminisheth, ceassing at a tendon, which to  
the sayd great Proceffe is knit, and that in the inner poynt thereof, where it is  
somewhat inuerten.

These y, Muscles haue the office to extend & stretch out the thigh, to attract,  
and draw it vpwordes, as also to lead it to the exterior partes.

The fourth hath an oblique situation, and springeth from the y, lower hoies  
of *Os sacrum*, with a fleshy (as it seemeth) and round beginnyng. The end of it is  
at a round tendon, which in the toppe of the greater Proceffe toward the post-  
rior partes endeth, and drawing the thigh to him selfe, hath also power to helpe  
the circumgation therof.

The fift Muscled is of the loynes sited in Abdomen, beyng round, fleshy, thicke  
and strong, sited somewhat oblique, and all blacke: his beginnyng is taken from  
the xi. and xij. Vertebre of the brest, and the y, uppermost of the loynes, where  
the body of the Vertebres is: it descendeth vpon *Os pubis*, and endyng at a round  
tendon, is to the lesser Trochanter inserted.

The vi. Muscled occupieth all the whole inner hollow part of *Os Ilium*: it begyn-  
neth from the whole Appendaunce therof, beyng placed in Abdomen with a semi-  
circular. rising: it descendeth about *Os pubis*, and is fleshy almost to the extreme

R. i.

end

V. Col. lib. 2. cap. 51.  
The Muscles of  
the straight gutte.

Col. lib. 5. Cap. 27.  
The round com-  
passing Muscled of  
the straight gutte  
called Sphincter.  
The y, other mus-  
cles of the straight  
gutte and their  
uses.

The Muscles of  
the thigh.

The mouynges of  
the thigh.

Col. lib. 5. Cap. 28.  
The Muscles  
mouyng the thigh  
are ten.

The first Muscled  
mouyng the thigh  
doth constitute the  
haunches.

The use of these  
y, Muscles.

The use of the fist  
and of.

7.

end thereof, where it degenerateth into a tendon, which to the lesser Trochanter is implanted. And the use both of the fist & this, now described, is to bowe the thigh. The seventh goeth out from *Os pubis*, neare unto the Cartilage thereof with a broad begynnynge, and oblique situation, but endeth on the inside of the thigh, under the lesser Trochanter with a slender tendon. And this nature made to draw one thigh toward an other, and to put one thigh upon an other. And thus sayth *Col.*, although in *dicke Vesalius* contrariwise sayth it serueth to bowe the thigh.

lib. 5. Cap. 50.

8.

There is no muscle in the body greater then the viij. (This *Galen* and *Vesalius* describ in the fist place) filled with such varietie of Fibres, as if a man couched to decriue, and not to teach, he might easily for this shew you ij. or iij. muscles. It springeth from the bone *Pubis* that is, from the inner part thereof. And from *Coxendix*, amplexeth the lesser Trochanter and tendeth downwardes cleauynge in that long and rough lyne, and in the hinder partes is fleshy. But at length begetteth a Tendon which to the head of the thigh on the inside is inserted. The use of which muscle is to creat the thigh: so doth it ayde the seventh also, when we intend to put one thigh upon, or a lost an other.

9.

The ninth muscle occupieth all that hole contained in *Os pubis*, and *Coxendix*, and that in the exterior part. His begynnynge is broad and fleshy, it goeth forth toward the exterior part, lyeth ouerthwartly, and alway becommeth narrower: so that at length it stretcheth forth into a strong tendon to be fastened in a certayne cavitie, in the great Trochanter appaunt.

10.

The tenth and last muscle of the thigh is in the interior part, and the aforesayd hole it likewise occupieth. This muscle (sayth *Collambus*) is not onely not to be neglected, but chiefly, and most especially to be marked, for it is marvellous therein to contemplate the great providence of the high creator. For the begynnynge thereof is broad and fleshy, as afoze is sayd of the ix. muscle, and from within, it is caried without about *Coxendix*, where a cavitie is made that representeth the forme of a polley. This muscle where it boweth to it self in going forth maketh oft tymes ij. tendons, sometyme foure, and five, which are at last united together, constituting one onely notable tendon, whose end in the posterior part of the greater Trochanter is finished. But ere I end, where this muscle beginneth first to tast of tendinous substance, there immediatly nature by great industry hath prepared a fleshy purse or bagge, wherein this tendon is safely placed from any hurt by the same bone, which is by this muscle comprehended; neither is the same fleshy bagge being so good a propugnacle, any way to be accompted as a distinct muscle from the other.

The marvellous  
creation of this  
tenth muscle.

**A**mbulation (sayth *Galen*) in man, is made by the one legge fastened one the earth, and the other taken from the same, and circunlated. But to fasten and set downe on the earth is the action of the foot, and to circulate, or fetch about is the action of the whole legge. This is not onely in going, but also in running: the one foot continually being set on the ground & the other together with the whole legge caried forward. But to chaunge the places of footing happeneth by the benefite of the legge: albeit that the stay of our falling, and firme setting on the ground, is brought to passe by the good composition of the foot.

Vesal. Epit. Cap. 2.

*Vesalius* describeth the legge as though it were onely to be extended, and bowed, without any other manner of motion, and therefore not notably accompteth about the number of it. muscles.

The legge.

But the legge (sayth *Realdus Collambus*) extendeth, and boweth, as is openly seene, according to the rectitude, or straight measure thereof, and is obliquely also towardes a exterior partes moved: although the same motion be obscure, which oblique motion *Vesalius* confesseth not. These same motions neuerthelesse are wrought aptly by 5. muscles, wherof 3. do bowe, foure extend, and one onely in the

Col. lib. 5. Cap. 20.

the hamme which geueth oblique mouing. And this one *Vesalius* imagined if it do any thyng, that it doth imitate the motion of the first muscle that moueth *Radius* directly downward. For it being sited obliquely could not haue or make any straight motion: and because he had denyed oblique mouing to the legge I omit to say he would not acknowledge the right office of it. But surely he hath left the use thereof to be of other moze aptly described, as appeareth by that is sayd. Whether fore so much the rather I giue credite vnto *Collambus*, and to his assertion as touching this oblique motion.

The motions of  
the legge are made  
by ten muscles.

The first of these muscles riseth both sinewy, & also fleshy frō the inner part of the Appendance of *Os Iliū*, but forthwith goeth forward fleshy, broad, & thynne like a swable band, & sloopwise is belated by the interior partes of the thigh, but whē it cometh to the inner head of the thigh, it proceedeth, & at a sinewy tendon is ended, which is not round (sayth *Collambus*) as *Vesalius* would, but broader, & fastened in the fore part of the legge. He also repetheth *Galen* (vnles his meaning was onely of Apes) in that he affirmeth, by the benefite of this muscle that one legge is layd upon an other, as children haue occasion to do in playing.

But to go forward, the second muscle of the legge springeth from the anterior part neare the Cartilage of *Os pubis*, the begynnynge thereof being broad, after the length of *Os pubis* committure: it descendeth fleshy, with straight Fibres, at the interior head of the thigh made round, and ceaseth at a sinewy tendon, also almost round: notwithstanding it is furthermoze dilated, and at length ended in the fore part of the legge.

The third with a sinewy begynnynge long, and also round, springeth from the lower part of the Appendance of *Coxendix*, being made fleshy afterwarde about the middest of the thigh, and is caried downe by the hinder part of the thigh, with many sortes of Fibres: but comynge to the knee, it maketh a sinewy tendon, wherewith it is implanted to the posterior but interior part of the legge.

The fourth from the same place begynneth neare vnto the third, but the begynnynge is both fleshy, and sinewy, and descendeth downward by the posterior partes of the thigh with straight Fibres. Neare vnto the knee it goeth out in a sinewy tendon, which before the end is dilated, and ceaseth at length in the Anterior part of the legge betwene the first and second.

The begynnynge of the fist is from the Appendaunce of *Coxendix* neare vnto the third and fourth, sharpe at first, then after thicker, and marcheth forward by the posterior but exterior part of the thigh. But where it hath wonne the middest of the thigh (a thyng woorthy to behold and note) it obtaineth a heape of flesh, springynge from the middest of the thigh, whiche least any body shoulde imagine to be another muscle, *Collambus* assureth vs it is not separable from this fist muscle neither to be accompted one distinct muscle from it. Neuerthelesse if any man will call the same fleshy part of the fist muscle an other new muscle. He supposeth it sufficient to haue admonished vs of his iudgment. In the same place it begynneth outwardly to degenerate into a tendon, which together with the aforesayd flesh descendeth enen to the end, and in the end is collocat in the head of *Fibula*. If the cause be inquired why nature added to this muscle this portion of flesh, *Collambus* sayth, that to the end this muscle might be made the stronger, Nature would that it shoulde come from the middest of the thigh to be the nearer vnto it: for on the outside is onely this muscle, but in the inside be foure. And the office of these five muscles rehearfed is to bowe the legge. Although that which *Collambus* hath orderly described in the fist place, *Galen* and *Vesalius* haue cited for the fourth.

The use of the  
first muscles of  
the legge.

This is that muscle that *Galen* sayth he commaunded to be cut in a certayne currour, who neuerthelesse could runne moze swiftly: which thyng is most vn-

Col. Ibidem.  
An unworthy say-  
ing of *Galen*.

A. ij.

Woz.

wozthy, for such a prince of Physick to imagine, or say. For this muscle being taken away: direct flexion can in no wise be brought to passe: which straight flexion of the legge, to be in running Galen admonisheth vs in *Lib. secund. de Anat. ad-muniſtrat.* And truly this case standeth cleane contrary: for such as be wounded or cut into this muscle, although the wound be not very great, yet when they are healed, it shalbe a labour vnto them to holue the same legge. Thus much of the Muscles bowing the legge.

Now, to the extensioſs thereof there be iij. in number seruicable. The vi. muscle therfore of the legge springeth from the middest of the Appendaunce of *Os I-lum* both fleshy, & also sinewy in the begynnyng. It is a short muscle, but thicke, and is ioyned to the greater Trochanter, there his flesh endeth: but then soloweth a broad, sinewy, and membranous tendon, then which there is no greater in the whole body: it comprehendeth almost all the muscles which are placed about the thigh, and hath straight Fibres. This tendon truly is of great nobilitie, much therfore to be marked of Chirurgians, least at any tyme trasuersely they deuide it. It complecteth the rotule of the knee, and to the Anterior part of the legge, and *Fibula* is at length inserted.

The seuenth hath a sinewy begynnyng from the greater Trochanter: and wholly compassing it: it cleaueth to the thigh above, and outwardly very thicke is this muscle, and all blacke, goyng forwarde fleshy with straight Fibres to the rotule of the knee, and furthermore endeth at a broad, and membranous tendon, which complecteth the same.

The viij. riseth sinewy from the necke of the thigh, and from the greater Trochanter as it were haung y. begynnynge, but is immediatly made fleshy, and cleaueth to the thigh. The progresse thereof is in the Anterior part inwardly marchyng downe to the rotule, with sundry sortes of Fibres: and the end thereof is a tendon, which also complecteth the knee.

The ix. issueth from the anterior part of *Os Iliu* above the ioynt of the hippe, sinewy and sharpe is the egression of this muscle at the first, but afterward fleshy, and round. The figure of it is as appertayneth to a muscle. It goeth straight vpon the forepart of the thigh betwene the seuenth and viij. muscle. But before it come to the knee, it engendeth a strong sinewy tendon, which from a narrow becometh broader, and ioyneth together with the tendons of the seuenth & viij. muscles, which together embrace the rotule of the knee: though their endes be inserted to the anterior part of the legge. These foure muscles last described do extend, & stretch directly forth the legge, euen as by the other v. it was directly bowed.

The x. muscle lyeng vnder the hamme, cometh out with a sinewy and round begynnyng from the outer head of the thigh, but afterward puttyng on a fleshy nature, and situated obliquely, with oblique Fibres, implanted fleshy to the posterior and interior part of the legge. Wherefore this muscle obliquely serueth to moue the legge towardes the exterior partes sayth *Columbus*: denyng what soeuer *Vesalius* hath sayd to the contrary.

The foote it behoued not to be round and hard (sayth he, that wrote the use of partes) but long, broad, soft, and oft deuided, because such lyke constriction is made for all difficulties of places: as clymmyng of trees, wales, rocks or such lyke. And I haue knowne (sayth he) whose toes haue bene mortified with snow, and cut of, and yet these in standyng, walking, nor running, would giue place to found persons, unable (notwithstandyng) to go downe, any hollow, or steepe place. And such as had the next part called the plant corrupted, might not go in plaine places: but *Tarsus* so spoyled, neither could they stand, much lesse go at all.

The construcion of the whole foote is therfore most proper and necessary to nature, so that it can both bowe, extend, and moue to the sides, by the helpe of his mus-

cles. Which are deuided into *Posteriores*, and *Anteriores*. Being in number xij. or at the most xij. albeit I know *Vesalius* there reckneth but nine.

The first springeth from the inner head of the thigh, above the knee backwardes, and begynneth fleshy and narrow. But in goyng forward is dilated, and about the middest of the legge endeth at a broad and sinewy tendon, which alway after is made narrow, and ceaseth at the superior, and posterior part of the heele.

The second is like vnto the first. For although it go out of the outer head of the thigh, yet in all the other space it doth the like that is reported of the first, so that it seemeth to be onely one muscle with two begynnynge. And albeit *Vesalius* hath these wordes, when as both these sayd muscles stretchyng from the head of the thigh downward, not farre from their begynnynge do meete together, and cleaue with fibrous knittynge, & the lower they descende, the stronger they grow together, so that now the tendon which either of them produced is altogether as one, spring from both the muscles: the inferior or first muscle (notwithstandyng) is somewhat longer fleshy carried downward, then the second: yet *Columbus* (with out any such wordes) sayth, that in dede it is one body and one tendon. And further, if it were not that he endoweth to shun by all meanes, what soeuer might make the mynde of the Reader perplexed, he would not sayle to asirme these ij. muscles (as they describe them) to be one, and onely a muscle, with a double begynnynge as is already sayd.

But in the meane tyme these two, whiche may so wozthely be called one, do make the posterior bellye of the legge called *Sura*, and by our vsuall phrase, the calfe of the legge.

The thyrde is a small muscle, rising from the outer head of the thigh neare to the ioynte. The goyng forth of it is sharpe in the begynnynge, after it stretcheth forth with a bellye, and is short: but endeth at a round sinewy tendon, then which among the round tendons in the body, is not a longer to be found. This muscle lyeth vnder these two aforesayd, is obliquely placed, and containeth oblique Fibres. It marcheth from the outer partes towardes the inner, cleauyng to the tendon of the two aforesayd, being yet at last implanted to the inside of the heele, and haung in office to euer the foote to the interior partes.

The iij. is the greater muscle of the legge, and blacke, and springeth from the posterior part vnder the Appendaunce of *Fibula*, with a strong, & sinewy begynnynge, but after goeth forth fleshy, and cleaueth to both the bones of the legge, extendyng them in breadth: but where it is come vnto the middest of the legge, it stretcheth forth narrow, and maketh out a tendon towardes the heele, then which, thzough out ma, none is more strong: and this tendon being united together with the tendon of the first muscles, is ended in the posterior part of the heele.

The office of the first, ij. and iij. muscles is to extend the foote, and set it to the earth, to the which thyng yet other foure muscles do minister helpe plentifully.

When Hector should be daine (as it was sayd) after that violent fashion, as the Hystory mentioneth, he was bosid by this tendon, & dayly we see how that bouthers do bag by whole heades therby: which sufficiently declareth the force thereof.

The fift muscle cometh from the two Bones of the legge *Tibia*, and *Fibula*, and cleaueth to the Ligament that is put betwene them to deuide the Anterior, from the posterior muscles. It is fleshy almost to the end of the legge, and neare to the inner ancle: it endeth at a strong, sinewy, and round tendon: and goyng vnder the inner ancle, as also vnder the botelike bone, at length endeth vnder the sole of the foote in the part that is called *Tarsus*. Nature begate this muscle to this use, to draw the foote inwardly: neither is it without a Ligament.

The vi. muscle floweth from the posterior part, with a long, and fleshy begynnynge, although that afterward it both degenerate into a round tendon, and goeth

Vesal. lib. 2. cap. 50.

The first muscle of the foote.

Lib. 2. Cap. 59.

Lib. 5. Cap. 10. Columbus affirmeth the first and the second both one.

What maketh the calfe of the legge.

The longest tendon in the body.

The tendon of the fourth muscle of the legge is strongest of all others.

The muscles extending the foote.

The tendon where by Hector was daine about the wall of Troye.

The tendon of the vi. muscle of the legge the greatest of all tendons.

The muscles extending the legge.

Chil. 6. part. Tib. 8. The foote and of the necessary figures thereof. The defect in such a want thereof. The want of the plant. The lacke of Ligaments. Col. lib. 5. cap. 50. The muscles of the foote.

The perforated tendons of the foote.  
The tendons that bow the foote of the foote.

goeth under the inner ancle, beyng endued under the hyle with a Ligament, spring from the Appendaunce of *Tibia*. The sayd Tendon is deuided under the sole of the foote into foure round perforated Tendons: whiche procede forward vnto the thyrde ioynte of the foure Toes (the great one accepted) and are there inserted for no small vtilitie: for they bow the iij. toes, and strongly bynd them.

The vij. begynneth long, and fleshy frō *Fibula* the space of thre fingers vnder the Appendaunce: it is fleshy, vntill it come vnto the hyle, where it is changed into a round tendon, which from vnder the Ligament vnder the ancle slippeth vnder the sole of the foote, and is inserted to the bone of the great toe, to bowe it. Whereto of the posterioir Muscles of the foote: now to the Anterior.

The first of these riseth from *Tibia*, that is from the Appendaunce neare vnto *Fibula*, cleauyng much thereto, and beyng sufficient thicke, is also greater then the rest of the anterior Muscles. This, where it is gone beyond the halfe length of the legge, becommeth narrow, and endeth at a round, sinewy, and strong tendon, whose progresse is by the vpper part of *Tarsus*: it is detained by a Ligament which issueth out from the inferior Appendaunce of *Tibia*, and *Fibula*. This is the Tendon, which is so lifted by, and euident to be sene vnder the skynne. It endeth at the part of the foote called the Plante, in the Bone that is put before the great toe: and hath the power to bowe the foote.

The second goeth forth with a sharpe begynnyng from the Appendaunce of *Tibia*, and cleaueth to the Ligament that lyeth (as is sayd) betwene *Tibia* and *Fibula*. Moreouer at the end almost of this same *Fibula*, the roote of this Muscle is fleshy: notwithstanding it endeth in foure round Tendons, which are detained vnder that Ligament, that riseth out from the Appendaunce of *Tibia*, and *Fibula*. These foure Tendons are enlarged, and at last inserted to the vpper part in all the toes of the foote, the great one excepted. So that they can extend, and stretch forth these toes.

The thyrde springeth fleshy from the middelt of *Fibula*, neare vnto the Ligament: then after degenerateth into a round tendon, which is also vnder the ouerthwart Ligament, caried and inserted to the last ioynt of the great toe, which it doth extend. This tendon is into y. deuided, whereof the one endeth as aforesayd, the other is inserted in the same bone of the plant, yeldyng helpe to the bowyng of the foote. This second tendon springeth also from the muscle: which portion in some seldome bodies seemeth to be an other Muscle, as some perhappes will suppose. But *Columbus* affirmeth it to be but onely one. Peruerthelesse he forceth not greatly, if any man thinke good to number and accompt it two Muscles. But then to the iij. (as before is named) must be added a 13. and so the number of the muscles seruing to the extreme foote, is xij.

The fourth springeth from the vpper Appendaunce of *Fibula* towards the exterior partes: it consisteth in the begynnyng both of fleshy, & sinewy substance, but is made fleshy afterward: lastly it putteth out a round tendon, and vnder the sole of the foote his endes are comitted to the bones of the plant. This Muscle turneth the foote to the exterior partes & consisteth vnder the transuerse Ligament.

The fift likewise bysteth forth of *Fibula*, with a long begynnyng, outward it is fleshy, euen as is sayd before of the fourth, and it marcheth on vnder the outer ancle, where together with the fourth it finisheth at a round tendon: and is inserted to the bone of the plant, that is put before the litle toe. So by meanes of this Muscle, the foote is drawne to the exterior partes.

But finally this is to be noted, albeit we haue sayd that the foote by all these Muscles either is extended, or bowed, els drawne outward, or inward: neuerthelesse it is certaine, that all agreying and in one action together concurrant, then the same, by all these together, is fixed on the ground.

Mus.

Muscles seruing to the toes, & placed in the extreme foote, are xij. in number. Although we haue aboue described other iij. which of some be holden, & others extend, as we haue aduised before. So it is to be indged, by which meanes it cometh to passe, that the Muscles seruing to the toes of the foote, be xij. in number.

The first therof of these viij. proposed, lieth vnder the middelt of the plante, begynnyng from the inferior part of *Fibula*, that is from the Appendaunce. To this is added a broad tendon, which Galen esteemed to springe frō the thyrde Muscle, which we haue accompted the iij. among the posterioir Muscles of the legge, Galen the fourth. The begynnyng of this Muscle is both fleshy and sinewy, vnder the plante it is deuided, and goeth forth in iij. round perforated Tendons, which are bowed to the second ioyntes of the iij. toes: a thyrde marvellous to be spoken, but more marvellous to be sene. Their office is to bow the second ioyntes of these toes. The broad tendon, which is added vnto this Muscle, is most sharpe of sense, so endued of nature to discerneth outward in my fleshy.

The second Muscle is produced also from the hyle, neare to the first, but is in the inner side almost round, and is tyed to that bone of the plant, which before the greater toe is preferred, so it purchaseth a Tendon, which to the great Toe is emplanted. And this was made to the end, that by it the great Toe from the other Toes, might be moued.

Also the thyrde Muscle springeth from the hyle, more vnto the first: the last the therof is toward the Anterior part, and is fastened to the bone of the plant that is put before the litle Toe, where the Process thereof is to be sene: and at length maketh out a tendinous substance to the same litle toe, to lead him from the rest.

In departing from these three, other foure do follow, as are euident vnder the sole of the foote, and bones of the plante, whose begynnyng bysteth out from the tendons of the perforating Muscle, which ceaseth in the thyrde ioynte of the four fingers, but these Muscles beyng of them selues small, and round, do mutually from the hyle receive a portion of fleshy vnto them.

Of these Muscles Galen and *Vesalius* do write, & that their office is to plucke away the iij. toes from the thyrde, or great toe, because they vnder the iij. round, and sinewy tendons, which goe forward to the outer part of the four toes, are bound to the superioir tendon, which we haue sayd to haue propertie to extend. But they march forward vnto the extreme toes, neither end they in the first ioynte as *Vesalius* would: who in this point was smallly diligent, when he grafitied to these Muscles but onely oblique motion. But know gentle Readers this to be my inuention (sayth *Columbus*) neither is this use of them knowne to any man that euer writ before us in Anatomie: for these Muscles moue not with an oblique motion, but do truly extend, and stretch out the four Toes: and so much they extend, as that by them they are more extended, they by the other tendons: as the eyes beyng tyed, it is easie to be perceived by any expert Anatomist.

Beside these there be y. Muscles in the bones of the plante. For to every toe y. Muscles are added, which are fetched frō the begynnyng of the foote, and end in the last ioynte of all the toes. They are fleshy, therefore tyed of nature, to obay to bowing more easely: which thing is brought to passe when two of them moue at one tyme: But other wise, when onely one of them inueth, then doe they draw the toes obliquely inward, and outward.

The last Muscle that is placed in the extreme foote, that is the xij. is situated vpon *Tarsus*, and *Pedum*, beginning from the Ligament, that knitte together the legge and *Fibula* with the foote. It is a broad and thynne Muscle, ending in y. tendons, and some tyme in iij. So is it at length inserted in the extreme part of all the toes, and in mouyng, those toes thereby are obliquely extended.

M. iij.

The

The Aquilon feeling to the toes are 12.  
How the Aquilon feeling to the toes are 12.  
The first Aquilon to the toes.

Fib. d.lect. Musc.

The four perforated tendons and their vly.

The broad tendon of the foote of most exquisite sense.

11.

12.

The tendon feeling the litle toe from the rest.

The perforating Aquilon.

13.

Vesalius and Col. differ in the motion of these iij. Muscles.

Col. Lib. 5. Cap. 31. The use of y. iij. Muscles extending the iij. toes according to Col. to vnder other knowe.

These Muscles feeling to the singular toes of the foote.

14.

The use of the 18. Muscle of the toes.  
Col. Lib. 5. Cap. 32.

The first Aquilon in the toe part of the foote.

The tendon in the foote that appeareth so neare, vnder the skynne. The tendon bowing the extreme foote.

11.

The tendons extending the four toes.

12.

Lib. Cap. 31. The Aquilon which is accompted the 13.

14.

15.

How the foote may be set to the ground.  
Col. Lib. 5. 31.



The Muscles be-  
ing to the cubite.

Two Muscles  
extend the cubite  
and the bow it.

The first Muscle  
bowing the cubite.

The cubit is both bowed, and also extended straight without any manner of oblique motion. Which thing surely every man may easily practise in him selfe. But these not being able to be brought to passe without the organs of voluntary mouing, let vs see what force of the are attributed to each manner of his actiō.

Two Muscles there be therfore for flexion, & as many for extension: although Galen maketh iij. to extension, which is manifest (sayth Vesalius) in Apes.

Of these, the first is a strong Muscle, euident vnder the skime, and sited in the interior part of the shoulder: it springeth frō the shoulder blade with iij. distincta begynnynge: wherof the one is sinewy and round, begynnynge from the upper part of the bow of the scapula, or acetabulum made in the scapula bone, it goeth further about the head of the shoulder, & slippeth through that chyncke that is sited in the same superiour part, which chyncke in deede nature created of purpose for this tendons sake. The other begynnynge of this Muscle, goeth out frō the Proccesse called *Ancyrōides*, partly sinewy, & partly also fleshy: but the fleshy part cleaueth to the shoulder, and seemeth a distinct muscle, & separated, which helpeth vnto the shoulder, since thereby he is drawing towardes the breast. Furthermore these thre begynnynge of the sayd Muscle are vniued vnder the head of the shoulder together, makinge a thicke Muscle and almost round, strong, and filled with straight *Fibres*, which in the elbowe leaueth at a sinewy Tendon, which neare to the end is dilated, and knit to *Radius*, who hath in the inside therof a Tubercle, made properly for the insertion of this Muscle.

The iiij. Muscle from the bone of the shoulder is called all fleshy, with straight *Fibres*, and lyeth hid vnder the first Muscle. It is carried fleshy beyond the ioynte of the cubite, and lastly fastened to *Cubitus*, and *Radius*. And the cubite by the v. little of these two Muscles, is made directly to bow.

The thyrde is produced from the shoulder blade a litle vnder the necke therof & is carried by the hinder partes of the shoulder: it is together with a broad tendon, & being fleshy, stretcheth his tendon to the posterioir Proccesse of *Vlna* called the elbow: and also goeth beyond the same. And straight be the *Fibres* of this Muscle.

The fourth hath two begynnynge from the necke of the shoulder, whereto it cleaueth much, and is so ioynd together with the thyrde, as that the thyrde and fourth seemeth one onely Muscle, with many begynnynge: albeit in deede they are ij: finally this fourth Muscle endeth where the thyrde, hanging also straight *Fibres*. And the office both of the thyrde, and fourth Muscle is to extend, and stretch forth the cubite straight.

As touching the hand so notably of the omnipotent creator created, as that it is most apt, and prompt to all, and every kynde of Art, defence, and safe prouision for the body, so as no member more declareth the unspeakable power of almighty God in the creating of man: because I will nether vse a double labor, nor yet detain the with bayne circumstance from the summe of the matter, I comit the to the History of Bones, where out of Galen compendiously we haue noted the noble vse and effourmatton of this member.

Here the hand is spoken of last of all after the same order, and accordingly as *Columbus* vseth, because the end of a tale is the better carried away. And this member is most notable, and worthy longest to be boine in mynde. The Muscles wherof (sayth he) will, in dissection, the longest endure incorrupted, both because, whilst we liue, they are more exercised, as also for that they are clogged with lesse fat. These, in describing, are (after the manner of Galen) to be deuised into outer, & inner Muscles, as those that moue the fote, before, are sayd to be deuised.

But to speake first of the interior Muscles, they be in number viij.

The first wherof is very proper: it springeth frō the toppe of the inner Tubercle which is in the shoulder, with a sharpe and sinewy begynnynge, and forthwith goeth

goeth small & fleshy, but beareth the true forme of a Muscle: for the head therof is small, the belly broad, and the tayle long, & strete, even downe to the wrist. This Muscle moreover goeth somewhat obliquely toward the hand, and endeth at a round, and long tendon, which runneth about the inner Ligament of the wrist, which being passed, of the remnant is made a broad tendon, which is extended through the hollow of the hand: but leauing the ij. greater hilles discovered, is at last among the iij. fingers bestowed. The true vse of this Muscle, is to helpe the fingers in bowing, and being exquisite of sense, what soeuer we therfore comprehend, or gripe in the hand that offereth vs any present hurt, (for in a moment we know it, by the sensibiliti therof) we cast away, and immediately auoyde it from vs, before it proceede further to hurt vs. Neither is it made to that end, as that the ball of the hand therfore should be without heare, as some would imagine, for *Columbus* writeth of certaine theues which had not this Muscle, but onely a tendon brought from the inner Ligament of the wrist.

The second goeth forth from the inner tubercle of the shoulder, tēdyng sharpe in the first begynnynge, both sinewy, and fleshy, it cleaueth fast to the cubite, and marcheth after the length of it vnto the rote of the wrist: and is vnto the cubite as a soft bed, or bowster: but first at the commynge therof to the wrist, it degenerateth into a Tendon, and both with a fleshy, and sinewy end is implanted to the fourth bone of the wrist of the hand.

The thyrde Muscle begynneth at the same place, with an oblique progresse after the length of *Radius*: yet in commynge likewise to the wrist, it goeth out into a round, and strong Tendon, which is inserted to that of the Postbrachiall bones that supporteth the little finger. The office of these two Muscles is, that, if both moue at once, they bowe the wrist, but when one alone styreth, then doth it moue obliquely, now vp, now downe, by the helpe notwithstanding of two exterior Muscles, as we shall come vnto anon.

The fourth hath a marvellous beginning. For it springeth sharpe and sinewy from the inner Tubercle of the shoulder, so that it becometh afterwarde fleshy: & is carried longwise after *Cubitus*, & *Radius*. After, when it hath passed the middell of the cubit, it stretcheth out narrow, & is ended in iij. round tendons, sinewy, & perforated, which are brought vnder the Ligament of the wrist, vnder which neuertheless the iij. first Muscles are not carried. The end of these tendons is in the second ioynt of the iij. fingers, which they serue to bow: & because they were to be penetrated by the tendons of the v. Muscle, going to the iij. ioynt of the foure fingers as shalbe sayd, therfore nature perforated these: which be sinewy, sayre, & shyning: a thing notable and marvellous to behold. This prudent nature also brought, to the end that the fingers after a certaine order should follow one another.

The fifth Muscle is much stronger then the fourth, and no meruaile: for that it behoued it to moue after, & with greater force, since it boweth the foure fingers, excellently contrayning them together. It springeth neare the fourth, but (for the most part) frō the upper and interior part of the cubit. It lyeth vnder the fourth Muscle, and straitnyng by litle, and litle, cleaueth to the cubit, before it come vnto the wrist: at last it goeth forth in iij. round, sinewy, and perforating tendons, which finally are inserted to the thyrde ioynt of the foure fingers, the thombe in deede being exempted, contrary to Galens mynde, who would haue the v. fingers bowed by this Muscle, and that one of the tendons therof should extend vnto the thombe: which to be true in Apes, *Columbus* playne affirmeth. For the thombe in man is moued by his proper Muscle, as shalbe sayd. This fifth (moreouer) cleaueth to the Ligament which deuibeth the inferior from the posterioir muscles.

The vi. springeth from *Radius* being likewise adherent to the same Ligament and iourneith downe along the length of *Radius*, endyng neare the wrist at a round

The ball of  
palm of the hand,  
the vse of the  
interiour  
Muscle of the  
hand.  
This Muscle  
maketh not the  
ball of the hand  
without heare.  
Col. ibid.  
Theues for the  
most part (sayth  
Columbus) want  
the first: i. i. i.  
the muscle of the  
hand.

The perforated  
tendons of the  
hand.

The 4. perfora-  
ting tendons of  
the hand.  
Gall. lib. i. part. 11.  
de anat. aduim. 1.  
& lib. de motu  
Muscl.

The hand.

wherby tab of all the  
speake of the  
hand.  
lib. 5. Cap. 33.  
Of the Muscles  
of the hand.  
What Muscles  
will abide longest  
in dissection.  
The Muscles of  
the hand are deu-  
ised into inner  
and outer Mus-  
cles.  
The inner Mus-  
cles of the hand  
are viij.

The first insertion  
Muscle of the  
hand

round Tendon and sinewy: which together with the Tendons of the fourth and fifth Muscles, runneth vnder the coape, or vaulde of the wrist of the hand, and finally is inserted to the last ioynte of the thombe, which it boweth.

7. The seuenth Muscle with a fleshy begynnynge commeth from the inner Tubercle of the shoulder, and from the vpper, and inner part of the cubit. It creepeth obliquely, and in the halfe space of the length of *Radius* endeth partly fleshy, partly sinewy, with oblique Fibres.

8. The viij. being foure square, placed neare vnto the wrist, riseth from the cubite, and fleshy also endeth in *Radius*: hauing transuerse Fibres, and transuerse situation. And the office of these two last, is in pzone order to turne *Radius*.

9. Of the outward Muscles. The first begynneth fleshy, and sinewy fro the outer tubercle of the shoulder, the puttynge on more fleshyne wareth thicke it marcheth betwene *Cubitus*, and *Radius*, till it come to the wrist: wherfore sometyne it stretcheth forth in iij. sometyne in iij. tendons, round, and sinewy, which passe through the hollow which is in the Appendance of *Radius*, but are gathered together by one of the Ligamentes which spring from the same Appendance. These sayd tendons in proceeding fourth further are broad, and end from the first to the thyrd ioynt of the iij. fingers. But when it hath onely iij. tendons, then is the little finger without. But after hath it iij. then thre: which tendons are stretched forth euen vnto the extreme endes of the fingers vnder the nayles: but are not inserted to the rootes of them. Hereby commeth the sensible feeling that consisteth betwene the flesh and nayle, as is proued when any hurt hapneth betwene them, by the great dolour that ensueth, although the same payne lyeth not betwene the flesh and nayle sayth *Columbus*, but betwene the flesh and the Tendons. And the office of this Muscle is to extend the foure fingers.

Why such payne hapneth by any solution of continuance betwene the flesh and nayle.

1. The second Muscle begynneth at the same Tubercle neare to the first with a sharpe begynnynge, and sinewy, so it is bozne forward betwene the first Muscle, and cubit after the longitude therof towardes the wrist, but it endeth at a round, sinewy, and sometyne double Tendon. Likewise it is caried about the wrist betwixt *Radius*, and *Cubitus*, and to the extreme end of the little finger is inserted. This round Muscle hath the office to lead the little finger from the rest, and is no small vse vnto vs for the making of the Valine of the hand.

The Muscle that leadeth the little finger from the rest.

3. The thyrd Muscle goeth out fleshy from the middle, very neare, of *Cubitus*, in what place of *Cubitus* is a long rough lye, made to giue begynnynge to thre Muscles. The situation of this is oblique, and the end at a round Tendon, which is inserted to the fore finger to extend, and stretch forth the same obliquely. But this sayd Tendon chuseth a Ligament from the Appendance of *Radius*, and this Tendon is deuided in some, into two.

4. The fourth Muscle with a fleshy begynnynge from the cubite neare vnto the thyrd, is oblique, and caried about the Appendance of *Radius*, then endynge at a round, and sinewy tendon, is to the thyrd ioynt of the thombe, to extend, and lead the same from the other fingers, inserted.

5. The fift from the same lye of *Cubitus*, neare to the fourth Muscle, with a fleshy begynnynge, and long, marcheth obliquely towardes the thombe, with many inscriptions, and ceaseth at diuers Tendons. Wherfore (sayth *Columbus*) he that delisteth in the multitude of Muscles, may deuide this into thre or iij, albeit he iudgeth it onely one: which is caried about the ij. horned Muscle. But it deuidenth sometyne into iij. sometyne into v. tendons, wherof one to the thyrd ioynt of the thombe, an other to the second ioynt, the thyrd to the first, and the iij. to the bone of the wrist which supporteth the thombe: there are sometyne beside in this place found ij. other tendons: and this Muscle hath the office to extend the thombe.

6. The vi. springeth from the roote of the outer Tubercle of the shoulder: it enu-  
braceth

braceth, and is knit vnto *Cubitus*, creppynge after the length therof: neuerthelesse in commynge to the wrist it degenerateth into a round sinewy, and strong tendon, which is caried about the Appendance of the cubite into a certaine hollow, neare to the Procelle of *Cubitus* called (as before is sayd or described in the Hystory of bones) *Stylois*: from this Appendance it taketh his Ligament, which is transuerse: it is inserted moreouer not farre from the wrist, to that Postbrachial bone that sustaineth the little finger.

The stylois of the cubite, named Styloides.

7. The seuenth which is called the two horned Muscle, springeth fleshy, with a long lye from the inferior part of the shoulder above the ioynt, and creppynge vpon *Radius*, endeth in the middelt therof in a strong, and double tendon, (being therfore called two horned) which, after it hath visited the wrist, is inserted to the Postbrachial bones, that supporte the foure finger, and middle finger. These ij. muscles last sayd, do extend the hand, or els thus do serue to extend the wrist when both at once do labour. But the seuenth, together with the second of the inner muscles, the other two ceassing, do carpe the hand obliquely downward. So the first, with the thyrd inner muscle, do baire it obliquely vppward. And this is their first vse. The second is to circūuerte, or turne about the extreme hād: which motio they shew, whe one in mouynge, both immediatly follow an other. Which vse of other Anatomistes, I perceiue hath bene nothing so well noted as of *Columbus*: whom for his diligence, I accompt no lost labour to imitate.

7. The ij. horned tendon.

8. The viij. muscle, which is called the lōgett, is brought from the shoulder, with a fleshy begynnynge, above the outer Tubercle: runneth obliquely vpon *Radius*, and is inserted into the Appendance therof with a membranous tendon.

The Muscles extending the hand. The mouing of the hand vppward and downward, the mouing of the hand in round compass.

The ninth is produced from the bond, whiche knitteth together the cubite with the shoulder, and passeth obliquely from the superior part of the cubit called *Olecranon*, and being all fleshy, is fastened to the middelt of *Radius*. These two muscles baire the hand vppward: and moue *Radius* outwardly.

9. The Muscles extending the hand vppward & *Radius* outward. The Muscles to the extreme part of the hād are 11. The distribution of these Muscles among the fingers.

Muscles of the extreme hand are in number xxi. neither at any tyme more, but sometyne fewer. That is to say xix. Of these muscles seuen (if they be the whole number of xxi. serue the thombe. But if but xix. then are they v. to the thōbe: foure go to the little finger, & ij. to euery one els, & one to the broad tendon.

The first is a little transuerse muscle, placed vpon the hill of *Venus*, & springing from the fleshy mēbran is filled with fleshy Fibres, and is inserted to the broad tendon, which to dilate it was therfore made. And this muscle (as sayth *Col.*) was neither mentioned of *Vesalius* nor the auncient Anatomistes before him.

The first Muscle of the extreme hand. The hill of Venus. Col. Lib. 5. Cap. 35. & Vit.

Foure other long, leane, and round muscles do follow, which goe forth from the tendons of the fift interior muscle, which boweth the thyrd ioynt of the foure fingers. These are placed in the ball of the hand, neare the first ioynt of the foure fingers. But they end in a round, and sinewy tendon, and are caried by the inner partes of the fingers after their longitude, cleauynge to the tendons of the first exterior muscle, by which the foure fingers are sayd to be extended. So these with their endes are committed to the thyrd ioynte of the fingers, but *Columbus* denieth that they are fastened to the first, as *Galen* and *Vesalius* haue professed before him, who although they knew these muscles, yet were ignorant of their vse and insertio: and you shall see how: for they affirme, that by these ij. foure fingers are led towardes the thombe: But sayth he (and that not without a playne demonstration of his reason) by these muscles, although they lye in the interior part of the hand, are the fingers. Notwithstanding, extended better then by the first of the exterior muscles, or at least asmuch. And they were put of nature in the inside, because the well considered the great perill that should euer be incident vnto them, on the outside if they were sited. Whereby it fortuneth many tymes, that although the tendons of the outside of the fingers be deuided, and cut in fun-

The Muscles extending the iij. fingers of the hand.

A thing very notable and little knowne.

S. ij.

der

der, yet the partie beyng hole, shall afterward neuertheless extend the same finger, neither is the Chirurgian that cureth it, the more to be extolled therfore: as diuers that (hauing small knowledge in Anathomie) do here and there, greatly esteeme them selues, for the good successe of such cures, purchased more by the benefite of nature, then their rare experience, or singular application.

The first muscle goeth forth from the Ligament of the wrist, and fro the forth bone therof, and it constituteth the hill of *Venus*: It marcheth forth by the inferiour part of *Postbrachiale*, and is almost round: then endeth it at a *Tendon*, which is implanted to the first bone of the litle finger, whereby the same finger is able to moue from the rest.

The seuenth beginneth at the wrist, and is placed in the vpper part: this Muscle is all fleshy, and endeth at the second bone of the thombe.

The eight cometh forth neare vnto the seuenth, is fleshy and placed toward the hollow in the hand: and with a small *Tendon*, is inserted to the second bone of the thombe.

The ninth is vnder the seuenth, from the same Ligament of the wrist, all fleshy, and ended at the first ioynt of the thombe.

These three Muscles make that fleshy part of the thombe, which *Palmeaters* do terme the hill of *Mars*: and they draw the thombe towardes their begynnyng: that is, do extend the same, and lead it from the rest.

Three other follow, whiche go out of the bones of *Postbrachiale* that support the forefinger, middle finger, and ring finger: their situation is oblique, or rather transuerse vnder the lyne of lyfe (as the *Palmeaters* terme it) they end in the second ioynte of the thombe: albeit their begynnyng is halfe circle lyke these three (notwithstandyng) could *Collumbus* be content to accompt one Muscle, hauing a broad begynnyng, a sharpe end, and enterweauynges of diuers Fibres, sayyng that he would not seeme too much to dissent from *Vesalius*, to shunne (if he may) the cauelyng tauntes of straungers. The vse of them is to bowe the thombe towardes the ball of the hand.

The seuenth Muscle of the thombe cometh from the *Postbrachiall Bone* that bayeth the forefinger, occuppyng the space betwene the forefinger, and thombe so that the situation therof is ouerthwart, & is inserted to the bone of the thombe, beyng thereby authorisid, to plucke the thombe towardes the same finger, and lay it aloft thereon.

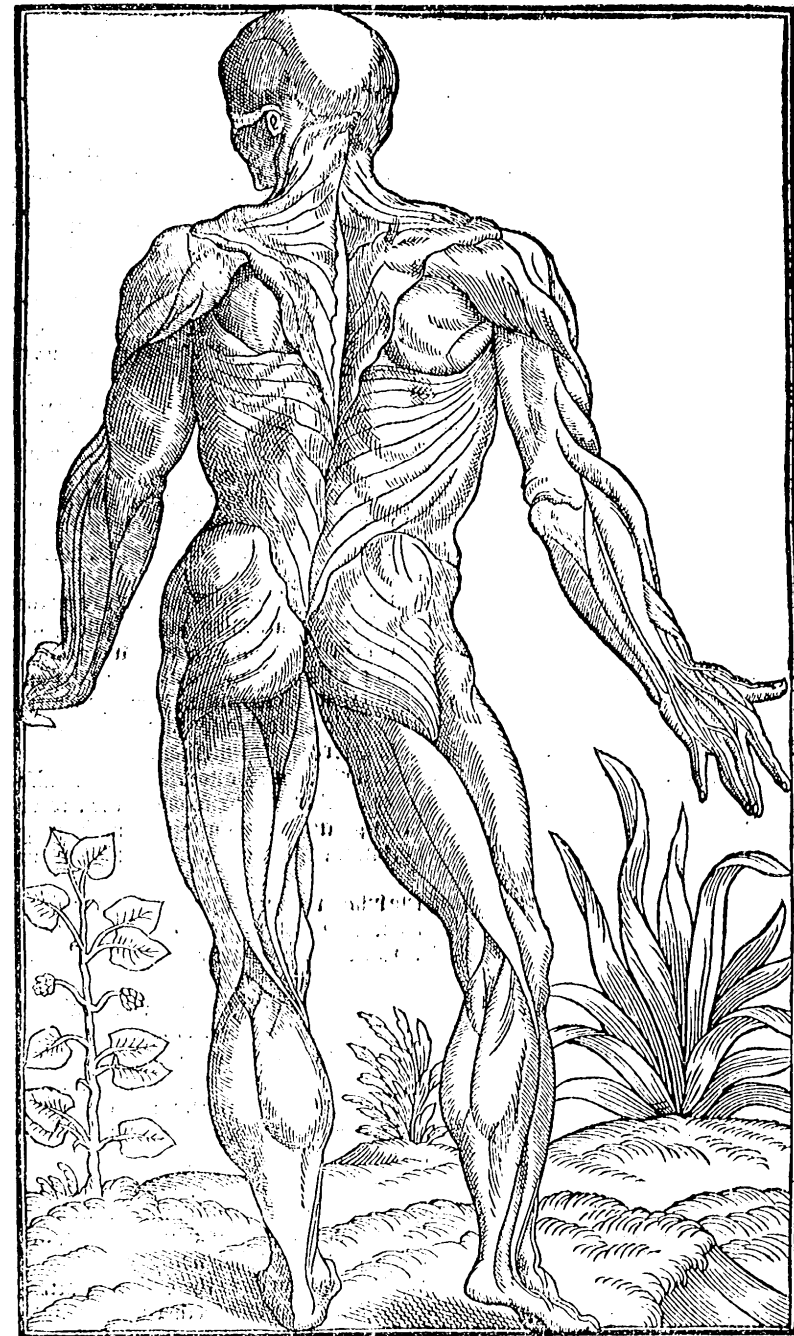
Besides these, there be yet other viij. Muscles, springyng from the *Postbrachiall* bones, & inserted to the first ioyntes of the iij. fingers. Of these, ij. beyng allotted to euery finger, exceptyng the thombe, in which none of them is settled.

These viij. Muscles are thus endued with offices: that is, of them by mowpyng together, do bowe straight the first ioynte, wherin they be implanted. But when one styreth onely, the obliquely they make their motion in bowing these ioynts.

And now here with myne authour, how mans members moue,  
I am come to the gole.

¶ An end of the Historie of Muscles.

¶ The



D. H.

¶ Of

The Muscles constituting the hill of Mars.

Three other Muscles in the extreme hand.

A Caueat giuen by Collumbus.

The seuenth Muscle of the thombe. The Muscle that layeth y<sup>e</sup> thombe aloft on the fore finger.

Eight other Muscles giuen to the fingers the thombe excepted.

The Muscles bowyng the fingers both straight and obliquely.

¶ Of the Hihory of Man, the fift booke describyng  
the instrumentes seruyng to nourishment,  
which is brought to effect, by meate drinke, that is,  
Of the nutritiue and naturall partes.

Gall. lib. 1. med. fan.  
Cap. 1.  
The necessitie of  
nourishment.

¶ The growyng  
thing hath a cer-  
tain powre to re-  
quite his necessi-  
tye.

Lib. 6. Epid. par. 3.  
aphor.  
Nature needeth  
no instructor,  
How the body is  
maintayned.  
How the ayerye  
and fierye sub-  
stance holceth.  
Euch. lib. 3. cap. 1.

The necessitie of  
instrumentes ser-  
uyn to nourish-  
ment.  
The kyndes of  
instrumentes ser-  
uyn to nourish-  
ment.

Lib. 6. de anat. ad.  
& de nat. fac. lib. 3.  
cap. 10.  
The vse of the first  
instrumentes.

The vse of the se-  
cond instrumentes.  
The vse of the  
third instrumentes.

1.  
The first instru-  
mentes.

2.

3.  
The extreme  
skynne called Cu-  
ticula.

Cuticula some loke  
it some reioyde.

Cut. lib. 1. Cap. 1.  
The Cuticula is  
insensible.

1.  
The first vntue.



When as the whole masse of man, for the insited heate therein, must needes haue runne in perpetuall ruine, and vastation, vntil other lyke substance continually in steade of that which wasteth, was restored: the almighty creator, not onely vnto man and liuyng creatures, but also vnto the very Plantes them selues, hath giuen a certaine power, to require that alway, which is wantyng and requisite for them. For neither to eate, drinke, or vse respiration we learne of any body, at any tyme, but immediatly euen from the begynnyng, we haue in vs that worketh all these without any instructor. As this that Diuine Hippocrates hath this elegant saying: Nature her selfe hath not by reason found the insitig to euery her actions: for neither is she of any taught, neither hath she learned to worke those thynges, which are conuenient: but by meat, what soeuer of dryer substance, and by drinke, what so of moyster wasteth, we restore. And so alway to the old estate we mainteine and redyce them both. For otherwise, then as the commoderation of aerye, and fiery substance, we hold by respiration, and pulsation of the Arteries.

Now whe that that floweth to euery part, ought to be of such nature as the particle it selfe, and none of all those whiche are eaten, and drunken, are wholly such: it was necessarie vnto Nature, first, that those thynges were concocted, and chaunged, and (so much as may be) assimilated, and made like to nourish, and restore the body, and after to expell those recrementes, whose generatio of necessitie followeth such mutations. For this cause chiefly (sayth Galen) Nature instituted thre kyndes of instrumentes seruyng to nutrition.

As, some for the first reason, to conceiue, and labour the nourishment, as also to distribute the same vnto the whole body. Others for the second cause, to be the receptacles of excrementes. The other particles for a thyrde reason, seruyng to the transmittyn of these excretions, vntymely excrete prohibityng, and in tyme delo readely expellyng.

Of the first number are the Ventricle which receiue the nourishment, and the Liuer, whiche maketh the greatest mutation of the nourishment passyng through hym, and the Veynes, which deriue the same concocted nourishment into the whole body.

Of the second reason are the Intrels, which receiue the dryer excrement, as the Vescicle of Choler, that whiche is thinner, and lighter: the Splene that which is moze earthy and thicke: the reynes, and bladder, the watrish part.

Of the thyrde, the Muscles: for they are vnto egestion seruiceable. All whiche thynges in their places shalbe described, and how they serue vnto nutrition we will declare: begynnyn first somewhat further of with the partes of Abdomen, as, of them in dissection, the Anathomist maketh first demonstration.

The outmost skynne (therfore) which is in Greeke called *Epidermis*, in Latin *Cuticula*, is the vppermost thinnest skynne, which onely most outwardly of all others entzappeth the body, beyn very thynne, and of it selfe altogether insensible: growyng swiftly, some lost, and some repayed agayne.

The insensibilitie therof is vnto the body very requisite: the outward partes beyn thereby freed from the dolour of ech light action, which otherwise we must needes

needes haue endured, not onely in applyng our handes to the holdyng of any thyng, and passyng with our fete continually to goe: but euen in wearyng also our garmentes vpon vs, no lesse then if our Bones were likewise of sensible substance, we should neither be able to go, much lesse frequent such violent actions, in the vse of our lyfe, as dayly we do.

Agayne, as Nature to so good end created it of insensible substance, so likewise she framed it most thynne, to the end the members sense should not thereby (moze then was conuenient, to the aforesayd end, and purpose) be dulled. Whether fore we may endure to handle, rubbe, or styre our members to, or with any thyng, which hath not either the sharpnes, or force to excoziate the same outer skynne: which if it had bene thicker, it seemeth certain our sense must needes haue bene the duller.

Besides, an other commoditie (no lesse needfull) it oweth vnto the body. For Nature hath endewed the same with an infinite, number of pores, or holes, to expell by them such superfluites, as Nature hath already giuen to the outer partes: and infrication, these manifestly do shew them selues.

In no wise many this skynne be deuided from the second by instrument not withstanding the force of fire, or hoate water maketh it by blisters diuisible rise from the other.

Next vnder this *Cuticula* appeareth the true skynne, called *Dermis*, in Latin *Cutis*. This couereth ouer all the extreme partes of the body, the eyes, eares, nostrils, and such other places, which nature for other vses most conueniently framed.

And the skynne, not onely of all the partes of man, but of his whole substance subiect to generation, and corruption, holdeth the meane betwixt hard and soft. For the skynne is as it were a perue endewed with blood, reteinyng a certaine meane betwene the fleshy, and sinewy, as though it were constituted of both mixed together. But the sinew is cold, and without blood: the fleshy hoate, and endewed with much blood. In the midst betwene both is the skynne, neither manifestly without blood, as the sinew, nor playnly with blood aboundyng as the fleshy.

Realdus Columbus (therein relectyng the iudgement of Aristotle, for the not beyn of sense in the skynne) sayth it is of white substance, endewed with sense, and filled with Veynes, Arteries, and sinewy Filamentes, therfore must it of force be marueilous sensible, to haue iudgement of euery qualitie: as in discernyng the excelle of heate, cold, or such exteriour iniuries, it might minister alway vnto the wittes a ready knowledge therof: so beyn a common meane, to preuent annoyance to the extreme partes of the body. As for example if any man laye his hand or other part sobainely to a hoate pece of yron, or such other, in a moment the sensible mixture of the skynne presenteth it to the wittes, whereby he is moued immediatly to plucke away, or remoue hym selfe from that present annoyance.

Howeouer the skynne euery where, cleaueth not alike vnto the subiect partes. For otherwise in the Palme of the hand, and sole of the fote, otherwise to the Musculous substance of the forehead, otherwise to the lippes, eye lyddes, eares, nose, fundament, yard, and otherwise throughout the whole body is it committed to the partes vnder lyeng, and in dissectyng must diuersly be separated.

Agayne among all the partes of the skynne is not alike distribution of perues, neither alike thicknes of the skynne in all partes: for to the skynne on the inside of the hand, very many sinewy fibres are reached, but to the skynne of the necke, few.

Likewise the skynne of the face is softer, and thinner, but of the necke, & soles of the fete, harder. That which innetheth the inside of the hand (vntil by labour it become harder) reteineth an exquisite meane in hardnes, and softnes, betwene

§.iii.

the

Bones insensible

The tenuitie of  
Cuticula.

The thicker Cu-  
ticula the duller  
sense.

Pores.

How Cuticula is  
separated from  
the true skynne.

The true skynne  
called *Dermis*, and  
*Cutis*.  
What partes are  
not covered by the  
skynne.  
Gall. lib. 1. de temp.  
Cap. 8.  
The skynne hol-  
deth a meane be-  
twene hard and  
soft.  
The substance of  
the skynne.  
The sinewe.  
Fleish.

Loc. citato.  
The skynne se-  
teth agaynst Ari-  
stotle.

The necessitie of  
sense in the skynne.

The brittle of  
sense in the skynne.

Vesal. lib. 2. Cap. 5.  
How the skynne  
cleaueth to the  
subiect partes.

Distribution of  
perues to the  
skynne.  
Thicknes of the  
skynne.  
Face.  
Softnes of the  
skynne.  
Palme of the  
hand.

Where the skinn  
is thickest.

Of motion in the  
skinn.

Skinn with  
beare wit.

Col. lib. 3. cap. 1.  
Pores in skinn.

Why some sweat  
lightly & continu-  
ly wayes.

Veal. lib. 2. Cap. 5.  
Fat, and how it  
is engendered.

Columbus.  
The use of fatte,  
Lib. de temperatu.  
That fatte is in  
men as well as  
women, contrary  
to Galen.  
In what bodies  
fatte aboundeth  
or defecteth.  
All fouer partes  
saue the yare and  
retricles haue  
their fat.  
The diuersitie of  
fatte according to  
the place.  
Fat is insensible  
contrary to Ari-  
stotle.  
Loc. citato.  
An other vntitie  
of fatte.  
The skinn called  
Membrana Carnea,  
why it is called  
the fleshy Mem-  
bran.  
Columbus.  
The fleshy Mem-  
bran vnder the  
armebole.  
Where Arteries  
runne betwene  
the skinn and  
Membrana Carnea.

the other skinn, and all the whole body, very neare appochoyng to the waight with equall temperature. But euery where the skinn of man, for the magni- tude of his body, is thinner then in foure footed creatures: although in man in the necke, backe, legges, and sole of the foote it chaunceth much thicker, but not in all alike.

Also some partes of the skinn are wholly immouable, and resistant to turne, as of the palme of the hand, and sole of the foote: others apt to turne and wynde, but not by any volūtary mouyng, as the skinn of the whole body, els that which in dede mouneth excepted: as that of the forehead, and all the skinn of the face, and which belwappeth the forepart of the necke, and sides. And this of motion is participant either by proper Muscles in it seruing, as of the forehead, eye liddes, and lippes, or for the cause of the nigh partes, as the skinn of the ball of the chēkes, which being destitute of Muscles, mouneth together with the next vnto it.

Furthermore some part of the skinn is hairy, as of the necke, armeholes, priuie partes, and chinne in men: others without, as the palme of the hand, and sole of the foote.

Besides such like places before mentioned, whereby the skinn is not left per- petuall, and generally coueryng all places, it is replenished with certaine pores, and holes, where through the sweatynge excrementes of the outer partes do passe. But those in some bodies moze large, in others moze strete: whereby it com- meth to passe that some sweate lightly, and with no labour, others agayne by no exercise may be prouoked to sweate.

**N**ext vnder this skinn lyeth the fatte of the outer partes, poured out be- twene the skinn and fleshy Membran. Whiche happeneth by the inter- course of Veynes and Arteries, whiche in those partes sweatyngly poure forth blood: which immediatly by coldnes of the Membran and slender heate, congea- leth, and degenerateth into fatte. It is aswell knowne vnto euery body in co- lour, as substance: wherefore needeth no other description, nor any such expli- cation as other partes.

But as touchyng the vse therof, it is by softenes a fitte propugnacle to the ou- ter partes, and a perpetuall sustenance vnto them: which although Galen affir- med to be plentifull in women, and litle or none in men, yet we see for certaintie, that it is founde in men euen as in women: moze plentifull in some, and with lesse store: but the truth is that in colder bodies it is copious, and in hoater very scarce. And forze profe, laye a part the yare, and purse of the testicles, and in all the other partes fatte may be found: and if you way the vse and mouyng of such as want fatnes, you shall easily finde out the reason of the diuersitie.

The substance of fatte is not euery where alike: for in the palme, and sole of the foote it is almost fleshy, and hard, made so for the necessary mouyng of those partes: but is not the organ of sense, as Aristotle imagined.

Also Vesalius affirmeth it a coate vnto the subiect partes: to conserue and keepe their heate in tyme of cold, and to coole them in tyme of heate.

**V**nder it lyeth a Membran called fleshy, in Latin *Panniculus Carnosus*, or *Membrana Carnea*. This is the fourth inuolucere, belwappynge all the body from the head, vnto the sole of the foote. It is called fleshy, in respect of that in the necke, and in respect of all other Pannicles in the body. And the elder foete called it fleshy (as it seemeth) because that in children it is fleshy, and filled with many Fibres, which neuertheless in tract of tyme do banish away.

But vnder the armehole this Membran is not fleshy, as Galen affirmeth *Lib. 1. de Anat. administ.* Wherby appeareth he imitateth to much the bodies of Apes, and beastes, but it cleaueth to the Muscles them selues: betwene which, and the skinn small Veynes do runne, but voyde of Arteries in all places, except in the temples

temples, head, yare, purse of the testicles, and fingers, in which places certaine Arteries (though selue innumber) are found runnyng betwene the skinn, and the same Membran.

This Membran is as it were the gate, or entrance for the Veynes, & sensible Fibres of the body, to passe through for sense, and nourishment vnto the skinn.

Forze it must be very sensible: not onely in respect of the Fibres that come through, but principally because it selfe is most of finewy substance. For it may be that in children it be fleshy, but in elder persons it retaineth small fleshyne, saue that in respect of other Membrans, it seemeth somewhat moze fleshy, as partly already is touched.

**A**fter this appeareth in Abdomen, and as it were deuidyng it in the mid- dle, a line, and round pitte, called the nauell, of the Latins *Umbelicus*: and the lyne or hollow tyng from it, for the whitenes therof, *Linea Alba*, the white lyne, or of some, the Vmbelicall Veyne.

This Nauell Galen and Aristotle supposed to be situate in the midst of the body, but Vesalius contrary thereto with many (I will not say frivolous) rea- sons repugneth, which Columbus agayne hath surely suppressed, affirming that of right, it occupieth the middle part of the body, since whilst we are in the wombe of our mother we are nourished thereby, and by the same also put fourth our excrementes.

The begynnynge hereof is at the Matrice, and springyng byward to the nauell passeth in thereby to the liver and endeth in *Vena porta*. But the Arteries (for so it is the receptacle of iiii. notable vessels) inserted to the nauell, and reached down- ward to the sides of the bottome of the bleedar, are continuall with the branchies of the great Arterie, after the principall diuision therof aboue *Os sacrum*. For the Arteries makynge entrance into the nauell, are united to the stockes of the great Arterie whiche descend vnto the legges, as hereafter shalbe exprest moze fully. By the benefite of the vmbelicall Veyne the child in the wombe is nourished, and by the office of the Arteries is replenished with infused beate, & vital spirite.

There is a fourth vessell called *Omphalos*, which begynneth at the bottome of the bleedar, and serueth to draw the Urine from the byth. And this together with the other vessels, the midwines do cut of, neare to the belly, so that after the infant be bozne (saue that it remaineth as a certaine corde or bande vnto the body) we finde not any notable vse therof.

**A**s for the Muscles of Abdomen, which in the Hypozie of Muscles are so co- piously handled, I commit the to the reading of the second booke. But here, because no where els we haue described the nature of fleshes, which so plentiful- ly belwapped the frame of man, ech where clad therewith, it shall not be amisse to say somewhat, to the end we ouerscape nothyng worthy, or needefull to be de- clared vnto the yonger sort.

**F**leshy therfore is a simple member, neither solid, nor absolutely moyste, but thicker then the moyste partes, and softer then the dry. It is begotten of blood meanelly dyled: whereby it hapneth that bodies aboundyng with blood be very copulent, and fleshy. So necessary it is vnto the body, as that nature hath left no part destitute thereof, the braine excepted, but either is in them contained or neare vnto them adioyned: fulfilling so, all the partes of the body, like the pla- ster, or dalube vnto the latted house.

Of the fleshy are sondry diuisions, diuersly set downe by sondry Authoers: here- tofore: as some of them affirme thre kyndes, of which, that is the true and sim- ple fleshy whiche groweth in the gummes of the teeth, and head of the yare. The second is vniuersally mixed with the Muscles, beyng euery where compounded with finewy Fibres, and diuerse substances according to the nature of the place.

¶ i.

The

Of the sensibillite  
of the fleshy  
Membran.

The descriptio  
of the white line  
nauell.

The situation of  
the nauell.

The vntitie of  
the nauell.

The rising and  
section of the  
white line,  
Fuch. lib. 4. Cap. 4.

The vse of the  
vmbelicall beate  
to the infant in  
the wombe.  
Col. lib. 1. Cap. 18  
Omphalos.

What is fleshy.

How fleshy is en-  
gendered.  
Gal. 10. de temper.  
What part is  
without fleshy.  
Whereto the office  
of fleshy is com-  
pared.

Of the kyndes of  
fleshy.



The fourth or ma-  
nerly digestion to  
speake of Gland-  
ules.  
Col. lib. 9.

Stabulate or net-  
tled where it is.

The office of the  
Glandules.  
Col. lib. 9.

Glandula Pinealis.

Glandules of the  
tall.

Of the eyes.

Whence teares  
proceede.

Of the lawes.

Of the tongue.

Of Larynx and A-  
spera Arteria.  
Why the throte  
boucheth not  
forth so much in  
women as in  
men.

Of the canell bone.

Of the phagus.

Of the Abdomen.

Of the ventricles  
called Panchreas.

Of the neck of the  
bleddar.  
The reflected in  
substance differ  
little from Gland-  
ules.

Of Glandules in  
the exterior  
partes.

The third fleshy is that of the Glandules, or kernels: which third part, because it is somewhat different from the other, I will somewhat digress to speake of them, that is, the Glandules, not unmedullary, nor improvidently made of nature.

As they are no other than a round body somewhat long, (for the most part) being rare and filled with pores.

For divers causes in divers places nature hath set them: but their generall proportion is to turne the blood which they receive, into their colour. Notwith- standing their uses be divers. Some are: as beddes unto Veines, and Arteries, to deteine them from hurt: others fulfill boyde places: others to receive and containe humidities, least any place through moving might be dried: others to receive excrementes. And those kindes of Glandules are to be found in divers partes of the body.

The first in the Scull after this sort, one in the braine, betwene the same and Cerebellum, which is called Conarion Pineale, described hereafter in the Historie of the braine and Arteries. This is round but somewhat long.

An other in the cell of Sphenoides, lying without Dura mater, in which endeth the bason or tonnell. What is ment by the Cuneall cell thou hast learned that in the Hypothesis of bones. And this is that Glandule which taking in the excre- mentes of the braine, sendeth the same afterwarde to the nose and Palate.

In the roundell of the eyes are four Glandules, two to every one, the right and the left: that is two above, and the rest beneath. Where they are placed of nature to receive the superfluous humiditie that cometh to the eyes, and there with to moisten, and refresh them, lest they by often moving should dry up, and afterwarde give over to moire. These are they which, being by sorrow or other cause constrained, do poure out teares.

There are other two Glandules in the lawes called Parathyroides, receiving also the humidities of the braine, to moisten those partes, which is greatly needed, when as continually in speaking, eating, inspiring, & expiring they labour.

Others likewise we finde under the roote of the tongue, small, and possessing the same vtilitie as before is sayd.

Two other cleave unto Larynx, and the rough Arterie, thicker in women then in men, whereby it cometh to passe, that the prominent part of Larynx in some women is apparant: the thickness of these making even with the same.

Under the Canell bones also, where Vena cava is divided into two, that is, Axillare, and Ingulare, are other Glandules slender in vs, but thicker in beastes, called Lactes and Thymus.

Agayne, in the hollow of the brest are other two ioyned to the middest to Esophagus, to moisten continually the same whereby the meate may passe, and slide downe more easely.

But in the vale of Abdomen there are not ij. but an innumerable sort found, throughout Mesenterium, dispersed for the division both of Veines, & Arteries.

Amongest which under the Clitricle is a certaine notable one, there set aswel for the division of Vena porta, as also to be unto the Ventricle as a propugnacle, lest in touching their backe, it should happen to receive hurt. The name thereof is Panchreas, that is Affuso, lying flat, or prostrate.

At the roote of Penis, and in the necke of the bleddar, are two little thicke Glandules called Parastates, and Asidentes, sitting downe, or resting. These receive, and containe the seede brought thither by Vasa deferentia, as hereafter among the partes of generation shalbe playnly taught.

And among the Glandules likewise may be accepted the testicles of the ma or woman: for in substance they differ little.

And since we have expressed the Glandules of the inner partes, and that it is

very

very necessary to be perfectly instructed also of those that lurke in the exterior members, we will speake somewhat of them before we passe, although I make hast to come agayne to the fleshes.

It is to be noted therefore, that neare unto the eares, as also under the nether jaw lyeth many Glandules, which serve both to the division of Veines, and Arteries, and to the receiving of certaine superfluities of the braine, being therefore called the Emunctorie places of the braine. These be sufficient great and thicke: wherein oft tymes chaunce those abscesses, called of the Grekes Parotides.

Moreouer under the armerhole are not a few of them, begotten for the causes afore mentioned. Which place is called the Emunctorie of the hart.

In the flanke besides that, betwene Abdomen and the thigh, are many Glandules to the same end and purpose ordained: this region being called the Emunctorie for the liver.

Neither is the bought of the cubite, and knee utterly destitute of these Glandules, although but small, made for the vessels division.

Some agayne haue them in their necke, armes, and legges. But those moze seldome.

Albeit the whole substance of the pappes is Glandulous, and fat, beside the nipple: which Glandules nature consented to make white, that thereby accor- dingly they might convert the red blood into white milke: since every thyng that is altered in the body, chaungeth into the colour of the same that altered it.

The Glandulous substance of the pappes was put so in the interior part of the brest, both for elegance of forme, as also to be yelved more fitly unto the infant in giving sucke: being reposed betwene the skinn, and fleshy Membran. And this briefe I chose as a sufficient description of the Glandules: which (now to come agayne) as is afore sayd, is accepted of some, a third kinde of flesh in y body.

Notwithstanding all the soft partes of the body, both inward and outward are generally comprehended under the name of fleshe: as of the outward partes, the Muscles, Glandules, gummies, &c. of the inward partes the hart, braine, liver, lunges, spleen, reynes, intestines, &c. Among all which, there being not two alike in substance how can the afore sayd division stand true? as for example, what part of the body is of such substance as the hart? What is like unto the liver: is any of such matter as the Spleen? Which (although I omit to speake of the rest) are sufficient (in my iudgement) to disprove the triple division.

Besides this, neither is the head of y yard, neither the gummies (which they would haue to be the onely true fleshe) alike one an other, but differ almost as much as the rest. Galen therefore to this purpose sayth there be many kindes of fleshes, and that simple fleshe is to be found nowhere, without the mixture of other partes. When if we divide the fleshes into three, and almost all the partes of the body so diversly vary in substance, how may this division stand: when among di- vers partes be divers substances, yea and divers temperatures, if Galen haue sayd truth, that the sanguin partes are hotter then those without blood, and so ac- cording to moze or lesse?

But further to omit long discourse, and therewith the opinions of divers, Ves- salius most properly (in my opinion) hath divided the fleshes into two, that is, the proper, and improper. And truly this is that which my coniecture sheweth at. For considering that some is hard, some soft, some inward, some outward, some begotten of blood meanly dyed, some more hard, some more slacke &c, it shalbe sufficient inough with Vesalius to divide them into two, and so (if it be lawfull) to call the proper Sanguinea, and the improper Exanguis. As that to be proper, or Sanguinea, which is engendred of blood: of what sort is the flesh com- pounded in the Muscles, the hart, and all the rest of sanguin substance. And that

Ac. ij.

im.

Glandules of the  
eares and nether  
jawe.

The Emunctory  
places of the  
braine.

Where groweth  
the abscess called  
Parotides.

Of the armerhole.  
The Emunctory of  
the hart.

Of the flanke.

The Emunctory of  
the liver.

The use of the  
glandules about  
the bought of the  
cubite and knee.

Where are gland-  
ules moze seldome.

The use of the  
glandules in the  
pappes.

The substance  
of the head of the  
yard and gummies  
is not alike.

Simple fleshe is  
nowhere in the  
body.

Divers partes  
have divers sub-  
stances and tem-  
peratures.

Epit.  
Two sortes of  
fleshes.

The proper fleshe.

The improper  
Reily.

March.

Gal. vi. part. Lib. 4.  
Siphach.

The description of  
Peritonaeum.

Col. Lib. 1. Cap. 10.

The figure of Pe-  
ritonaeum.

Velal. Lib. 4. cap. 2.

Peritonaeum one of  
the similar partes.  
The beginning of  
Peritonaeum.

The end of insec-  
tion of it.

Peritonaeum com-  
pared to a bottell.  
The length of it.

The inside of Pei-  
tonaeum.

Col. Loc. cit.  
What partes pei-  
tonaeum clotheth.

Lib. 4. vi. part.  
The uses of pei-  
tonaeum.

improper, or *Exanguis*, which containeth not blood, but is of nature for other no-  
lesse use ordained, and created: as is the hayne, the sinewy partes, Glandules &c.  
Hetherto all the partes spoken of, together with the Muscles of the belly de-  
clared other where, are comprehended under the name of *Mirach* (for so the *A-*  
*rabians* call it) or more properly after Latins *Abdomen*.

**N**ow followeth the Membran named *Siphach*, or *Peritonaeum*, which, enclo-  
sing more nearely all the nutritive partes, that is, betwene *Septum transversum*  
and the thighs, is a thinn coueryng, but strong and tough, made of si-  
newy substance, entwarryng thus the lower belly, from the left to the right  
side, and going by the gutte *Ilion* unto the turning ioyntes of the loynes, com-  
passeth all the bowels and partes within Abdomē. The upper part wherof clea-  
ueth to the lower part of *Septum transversum*, and the nether part, unto the bones  
of *Pubis*, and *Ilium*. Wherefore the Grecians named it *Peritonaeon*, wherehence  
the Latins haue borrowed this word *Peritonaeum*: As that, which forgardeth,  
and circumplecteth all the subiect vessels and bowels: no otherwise then as the  
whole cauitie of the brest, together with all the inner partes which the brest con-  
taineth, are clothed, and compassed about with the Membran called *Pleura*. *Peri-*  
*tonaeum* is in figure somewhat round, strongly knit unto the Spine, where it  
sheweth it selfe also thicker: and it is so thicker neare the Spine, because from  
thence it was to be deuised into many partes.

It is a Membran of thinn substance, like broad & continuall spider webbes,  
with no Fibres at all interred. Wherefore is accounted in the number of the  
first of the simple bodies, called Similar partes. And it is among all other simple  
Membrans of the body, the largest, and greatest. The beginning wherof is taken  
on each side from the Ligamentes, which do connect, and knit together the Verte-  
bres of the loynes, and which commit *Os sacrum* to the bones of *Ilium*. Thus fro  
them, as a broad Membran deriued. And ascendyng immediately from other side,  
is couered ouer with the Muscles of the loynes, and with these, which occupieng  
the insides of *Os ilium*, giue motion to the thighs, and with Fibres cleaueth to  
them, such as we see Muscles in them selues committed together withall. But so  
sone as it hath surmounted the Muscles, it stretcheth forth to the inside of the  
transuerse Muscles of Abdomen, & to the whole inferior region of *Septum tras-*  
*uersum*, most firmly growyng to them, or especially to their sinewy tenuities.

*Vesalius* sayth, *Peritonaeum* representeth the figure of a long bottell, lyke an  
egge, the length wherof pertaineth from *Septum transversum*, downe to the  
lowest seate of the amplitude, whiche *Os sacrum* together with the other Bones  
committed to his sides, effourmeth.

Furthermore the inside of *Peritonaeum* reacheth out certaine Processees to those  
instrumentes which it containeth, both bynding them thereby together, and also  
knittynge them unto it selfe, not denyng to bestow of euery of them an inuolucere,  
besides their owne peculiar coates, whiche they unto them selues do properly  
possesse. Wherefore, besides that *Omentum*, and *Mesenterium* are from it natu-  
rally deriued, and *Septum transversum* (as is also sayd) clothed, it inuetheth the  
liuer, and not so alone the liuer, but also the spleene, ventricule, intrels, reynes,  
vzinarie wayes, bleedar, and matrice in women, with Veynes, Arteries, Ner-  
ues and Glandules.

Galen reciteth sundry profitable uses of *Peritonaeum*. As first that it couereth  
all the subiect partes and vessels under *Septum transversum*: as the Ventricle,  
intestines, the kell, *Mesenterium*, liuer, spleene, reynes, both the bleedars and  
(in women) the matrice.

Secondly, that all whiche it embraceth, it deuiceth from the outer couersing  
Muscles, lest any of the small intrels slippe into the spaces betwene them, and so  
(whilst

(whilst they presse and strayne together) be graued with payne, the Muscles  
hindred of their mouyng, and the excrementes contained in the intrels, down-  
wardes difficultly transmitted.

The thyrde use of it isto diue out the excrementes of dyce nourishment, toge-  
ther by the helpe and labour of *Septum transversum*. For *Peritonaeum* in the su-  
perior extremities therof, commyng to the brest and false ribbes, after the ma-  
ner of *Septum transversum*, somewhat aydeth the compresse motion of the Venti-  
tricle and intrels. For by this same *Peritonaeum* and *Septum*, as by two handes  
iointed together aboue, but distaunced beneath, what fouer lyeth in the middelt  
is compessed, and the excrementes of meate downwardes compelled.

Fourthly, beyng therewith compassed as a coate or inuolucere, it might con-  
serue and bynde altogether, lest the Ventricle or intrels beyng left to slacke,  
should by euery light occasion be filled with ventositie. For when these become  
more infirme and weake, then that easely they can be drawne together, immedi-  
ately with vapourous and windy spirites they are filled from euery meate. In  
the meane tyme, of necessitie it followeth that the meate is left destitute of con-  
coction, and distribution therof in the body slowd.

The fift, and (as *Erichius* sayth) most principall use of *Peritonaeum* is to con-  
teine all the bowels, and vessels under *Septum transversum*, and as by a certaine  
skinne euery of them, beyng particularly couered, might safely be bound toge-  
ther, and in their fixed seates abyde. For the continuities hercof beyng violated  
and broken, bringeth no small danger, especially if any of the interior partes  
be also wounded. But it alone broken, the disease ensueth called in Greeke *κρηνη*,  
in Latin *Ramex*, and in English a rupture.

And beyond all this *Realdus Columbus* teacheth vs an other use therof, which  
heretofore of no man hath bene marked: that is, from the halfe space of Abdomē  
upwardes it is a simple Membran, but from the natiell downwardes doubled:  
the use of which reduplication is, first for the Arteries called *Umbelicales*, for the  
vessell named *Oiragos*, for Veynes and Arteries ascendyng under the straight  
Muscles of Abdomen, which vessels betwene this same reduplication of *Perito-*  
*naeum* are contained, all which he reporteth neuer any man to haue found out be-  
fore him as also for the bleedar: and agayne this same doubleness of *Peritonaeum*  
is a meanes, that the intrels might more strongly and safely be contained.

*Peritonaeum* finally is in the inside smooth, but without rough, to cleaue unto  
the sayd Muscles and their tendons more strongly. In many places it is perfora-  
ted, but not so oft (sayth *Columbus*) as *Vesalius* imagined.

From the partes of this same *Peritonaeum*, procedyng on both sides from the  
backe, cometh this same *Omentum*, called of the Greekes *επιγαστρον*, in Eng-  
lish the Kell. Which mætyng on both sides ouerthwart the bellye, passe upward  
euen to the stomache, and uppermost part therof: beyng a fat pannicle or coue-  
ryng, simple, & without Fibres, but aboundyng with Veynes, Arteries, sinewes,  
and fatnes. It is situated aboue the spleene, and in the forefront of all the intrels,  
and is stretched out to the hollow of the liuer, to the posterioir part of the Venti-  
tricle, and almost all the whole bottom therof.

The fashion of it is lyke a satchell or bagge, hauyng a round Orifice, and  
higher in posterioir then in the Anterior part ascendyng. After the same ma-  
ner, we call one part of the Kell the Anterior or Superioir Membran, and the  
other the inferior or posterioir: although in dede the Kell be onely one Mem-  
bran, and that especially in dogges, the Anterior part beyng one and continuall  
with the posterioir, and so the Kell, after the maner of a bagge, both constitute a  
cauitie, which may be filled. All which shalbe more evidently discerned, if the  
same (deuised from the partes of the backe and bottom of the bleedar, beyng in  
W. ij.

The brittle of  
Septum transversum  
and peritonaeum in  
anatomye care-  
mentes.

How Peritonaeum  
aydeth concoction  
and distribution.  
Loc. cit.

The hunc that  
enricheth perito-  
naeum being rup-  
tured.  
The Rupture.  
Loc. cit.

A new use of pei-  
tonaeum.

The use of the re-  
duplication of pei-  
tonaeum.

The use of the af-  
finity of pei-  
tonaeum.

Gal. Lib. 4. vi. part.  
Omentum  
The compass of  
the kell.  
The partes con-  
stituting the kell.  
Situation.

Velal. Lib. 5. cap. 4.

The figure of the  
kell.

no other place broken or perforated) you couet to fill ether with liquid, or Solid substance.

The progresse of the hell.

Furthermore like a round orbicular circle, beginning from the middes of the backe vnder the posterious part of the Ventricle, it is caried by the hollow of the liuer, after the bottome of the Ventricle (from whose thyd coate there it springeth) to the hollow of the splene and so vnto the middes of the backe, as it were with his begynnyng. Therfore the whole inferiour halfe circle, from the hollow of the splene by the backe, comynng euen vnto the right side of the Ventricle, doth constitute the inferiour Membran of Omentum. But the Superiour is formed by that part of the circle, which is brought from the right side of the Ventricle by the bottome thereof, vnto the hollow seate of the splene. Hence both mutually meetynge, are also downwardes dilated about the intrels, and vnder Peritonium, and couereth them both before, and on eche side: stretchynge downe to Os Pubis, with his lower extremitie.

The inferiour part of Omentum.

The Superiour part of Omentum.

What partes are tyed to the hell.

These Membranes are with no tynges bound vnto the intrels, save the inferiour Membran onely: which in men, is strongly continuall vnto the intestine Colon, and that all the length thereof that marcheth vnder the bottome of the Ventricle. Neither may this be negligently in man obserued: when as the inferiour Membran of Omentum serueth to Colon, there in the steade of Mesenterium, whereby the same is reached vnto the Ventricle. For Colon in all that space requirerh no part of Mesenterium, farre otherwise then in dogges and Apes. For in dogges it cleaueth to no intrell, and in Apes retaineth a meane betwene both, which made Galen also differ.

Why the hell is knit to Colon.

Vesal, Loc. cit.

The veynes enfolded in the hell.

The Veynes enfolded in Omentum, makynge so the image of a nette, are onely the branches of Vena porta, but none from Cava commeth to Omentum. They are scattered out from that branche of Porta, whose principall portion is drawne out vnto the splene: so thence innumerable branches of Veynes runne abroad in the Membran of Omentum, not straight forth, or with direct trases, but with a boundant oblique courses, and wanderyng walkes: like as in the manner of weaving of nettes is to be seene.

The Arteries of Omentum.

The Arteries of Omentum breake off from those, which to the Ventricle, liuer, splene, & vessicle of Choler are distributed. These all together with the Veynes, Omentum safely leadeth, and to his Veynes from them obtaineth fellowly mates, so that there are fewe furcles of Veynes to be found not associated with like portion of Arteries.

The Arteries of Omentum.

Agayne, Omentum is (thyddly) enterwoven with those Perues, which from the portions of the vi. payre of the brayne, reached after the ribbes, are emplanted to the liuer, splene, and Ventricle.

The facts.

But the fat wherewith Omentum floweth in dull and fat ment, is abundant, but in leane, litle and scant.

Beside that, which is common to both the Membranes, the inferiour Membran thereof, where it is stretched vnder the posterious seate of the Ventricle, hath specially a certaine great, and notable Glandulous body, which because that in dogges it is red, and after a certaine manner like simple flesh, the Grecians therefore call it *Calicreas*, and *Panchreas*. But in man it appeareth more white then red: situated there to Vena porta, and to the branches of Arteries and Perues for their secure derivation, onely bouldred by the inferiour Membran of Omentum, and layd vnder the Ventricle to enrich the same with ease. For all the vessels, eue where they begyn to deuide & ramifie, there also do they easily incurre damage, as if any euill be incident vnto them through violent mouyng, that part which was lately deuided, doth immediately incurre the same. Nature therefore not rashly, where (of Veynes) such distribution, & diuarcation ought to be made,

placeth

placeth this Glandulous body, to entwappe the, and fulfill their diuisions: that none of them for lacke of defense, should be soyled, but resting in a body soft, and meanelly yeldyng, although they happen to be prouoked with a more vehement mouyng, yet because they are not shielded with hard and stubburne partes, but such, as by lightly receiuyng them, do gently exolve the violence of euery motio, they are from hurt, breaking, or straining perpetually conserued.

This body is called *Panchreas*, that is, all carnous or fleshy, for that it is made and conserued of Glandulous flesh. But *Calicreas*, because it is sweete and pleasant in eatyng.

Why nature in sundry partes layeth standant long bodies.

Why it is called Panchreas, and why Calicreas.

To declare briefly therefore the uses of Omentum, it enfoldeth the branches of Porta, and them enfolded leadeth to the splene, Ventricle, Duodenum, and Colon. And not onely those branches, but also the Arteries and Perues, which to the sayd places were also to be inserted. And this *Vesalius* iudged the greatest and most excellent vse thereof.

Vesal, lib. 5. cap. 4. The vse of Omentum.

Agayne this is not the least, that by it the Ventricle is bound to the backe, and agayne the liuer, and splene knit vnto the Ventricle, together with the interuerture of vessels, and sinewes. And beyng to the intrels accidentally made an inuolucure, both cherish and continue that hart like a cloth, or stomacher. Wherefore such as haue Omentum, or any part thereof cut away, they feele the Ventricle, or stomach (as most the common sort terme it) colder, they digest lesse, and stand in neede of outward helpe: chiefly if the part that is taken away be in great quantitie. Wherefore the hell is not to be robbed of this benefite it yeldeth to the furthering of concoction.

The usefulness of the hell.

The instrument of which operation is the Ventricle, which is that part of the body, into which liuyng creatures receiue their meate ordained by nature to make of the same susteyning, by concoctyng & makynge the first mutation.

The ventricle.

Why the ventricle was ordained.

The situation of the ventricle.

The neck of the ventricle called stomach.

Col. lib. 11. cap. 4.

Under the best and *Septum transversum*, next betwene the liuer and splene it is seated, obtaining a passage, which reacheth in the meates fro the mouth, called by all these names: as *Esophagus*, *Stomachus*, *Gula*, and after the *Arabians*, *Meri*.

The begynnyng of the stomache is at the roote of the toung, in the lower part of the iawes behynd *Larynx*, to which it is knit, and not to it onely, but also to the Anterior body of the Vertebres of the necke. This receiuyng the meate, compelled thereunto by agitation of the toung, driueth it downe to the dilated partes thereof.

The beginning and progresse of the stomache of the necke of the ventricle.

The substance hercof is sinewy, and Membraneous, made therefore to dilate, & readely gather together agayne, enterwoven with Fibres ministring vnto his office. The rest of this body is very rosid, and within excellent smooth & slippery.

Vesal, lib. 5. cap. 3. The substance of the stomach.

It consisteth of two proper coates, one specially differing from an other in substance, hardness, thickenes, and kyndes of Fibres. The first of these, or inner coate is more sinewy, hard, & somewhat thinner, & with the coate of the mouth & palate continuall, endued with straight Fibres to the attraction of meate, as handes. But the outer coate is thicker, softer, more fleshy, almost participatyng with the Nature of Muscles, and with transuerse or circular Fibres abundant.

Telle etiam Gal. lib. 3. de nat. fac. & lib. 4. de part. & lib. 5. de vitiis.

The coate of the stomach.

The fibres and their vse.

And thus nature intended onely to place two kyndes of Fibres in the stomach: as the straight to attract, and draw the substance, and the transuerse to driue it down: neither had any more bene commodious. For had there bene any of oblique race, the meate must needes with ouer long delay haue taried in the stomach, to the no small greuaunce of the body: for as much as the stomach filled with meate, if very long it should be distended, must needes ouer long also be a let, whilest they are dilated, vnto the lunges, rougher Arterie, and also great Arterie. Nature therefore so prouidently contriued the seate of the stomach, reachyng through the necke and best vnto the Ventricle, exactly vpon the middes of the Vertebres of

Why nature placed but ij. kyndes of Fibres in the stomach.

the

The notable difference of the stomach downe to the ventricle.

the necke, and the foure first of the best, inclining to nether side, but so aptly under the rough Arterie placed, as by no meanes to molest y<sup>e</sup> organs before named.

Agayne at the begynnyng of the fift Ventricle of the best, the stomach; that it might giue place to the greater trunkie of the great Arterie, marchyng after the Vertebres of the backe to the lower partes of the body, somewhat declineth to the right side from the middle region of the Vertebres, creepyng nether to the same Arterie downe to the ninth Vertebre of the best: from the body of which Vertebre it is immediately elevated, and departing further of the same Arterie (left in swallowyng the meate it might fortune to be compressed) penetrateth at length the finelwy part of *Septum transversum*, towardes the left side, but neuerthelesse is altogether estranged from that hole, which the great Arterie, in fallying downe to the inferiour members, occuppeth: for it hath one peculiar to it selfe, and to the perues therewith descendyng, prepared.

After all this, at the begynnyng of the ix. Vertebre of the best, the stomach, by the interuenture of *Pembrias*, produced from the Ligamentes of the Spondils, is to the bodies of the Vertebres committed, and posselseth from those *Pembrias* a thyrd coate, as it were, of his second an inuolucure, mingled with no Fibres at all. But, that, neare to the fift Vertebre of the best, the stomach sheweth it selfe rather on the right then on the left side of the Arterie, the Arterie it selfe is the cause, not as a tyran occuppyng the middle seat of the backe, but whilest it taketh his begynnyng from the left Ventricle of the hart, and by the rest of his way is subiect vnder *Vena cava*, towardes the left side, of necessitie in greater part to the left side bendyng: and therfore, somewhat giuyng place to the stomach, admitteth the same a fellow or companion of the seate of the Vertebres, so that the stomach might be lesse oblique, or crooked, and obteyne also firmer seate then in the left side might be found.

Furthermoze the stomach both not perforate the right side of *Septum transversum*, neither is stretched straight into the Ventricle from the right side of the backe, but beyng caried aboute the Arterie, and oblique or crooked, with an obtuse or blunt cogner, seeketh the left side, lest the stomach in going to the Ventricle, should haue bene compelled to perforate the liuer, which occuppeth all the right side of the inferiour region of *Septum*: but freely findeth out that part in *Septum*, where as lesse of liuer beyng, yeldeth easie passage thereto. Such is the thinner portion of the whole liuer, stretched to the left side of *Septum*, as that in the posteriour region therof, where the stomach goeth throughe *Septum*, it hath a cauitie like a halfe circle engrauen for the stomach, whose Anterior part it ampletheth, ther to in proportion agreeing.

But it sufficed not nature to giue vnto the stomach so oblique, those sayd Fibres, for the speedy passage of meates, but also, to the end his concauitie might alway be with moisture annoynted, she hath placed Glandules both in the iawes, stomach, and *Larynx*: which perpetually, lest those organs should be dyed, prepareth them humors, and spittle. The Latins terme them *Tonsille*.

Also in the middle space of the stomach, where the same is subiect to *Aspera Arteria*, in that place as it is deuided into two trunkes to the lunges, two others are put, not onely before the stomach, but also cleauyng to the sides and posteriour part therof: playnly answerable to those, wherewith nature hath compassed the begynnyng of the necke of the bleeddar in men. For euen as these do irrigate, and moysten the way of Urine, and seede, so the Glandules fastened to the stomach humect his amplitude, and lest by drynes the meate should with difficultie fall into the Ventricle, do imbue & walke it with a certaine spetelly humor.

The stomach, immediately as it hath penetrated *Septum* in the left side of his finelwy part, is made continuall with the body of the Ventricle, which touchyng a great

great part in the left side, of *Septum*, vseth the whole region or space betwene the liuer and splene. But in the right side, the Ventricle no where toucheth *Septum*, but all the right side, & whole superiour part therof is hidde of the liuer: being somuch therfore distant from the middest as the thicknes therof cometh to on that side.

The figure therof is round, & somewhat therewith long, from the right stretchyng to the left side, assimilated of *Colicibus* to a gourd long, & round fashioned round, because all round thynges are moze capablie; and lesse subiect to injuries: but long, because so, both the place wherein it is contained, and also the two Orifices therof, one whereby it receiveth meate, the other whereby the same contained is thrust downe vnto the intrels, do require.

In the left side also it is much moze ample, and round, a little pustyng forth toward the inferiour partes, and thence forthwith turnyng to the right side, is by little & little gathered together to a strete, & in the vpper part descendeth, but in the nether ascendeth: so that in the right side it becometh much moze slender then in the left. Also in the superiour part therof, which pertaineth frō one Orifice to another, it is moze strete and narrow, as in the inferiour, larger and broader.

In the Anterior part it is equally euery where Gibbous, and no where deformed. In the posteriour region it sheweth after a certaine maner two Gibbous partes, one on the left side, and the same greater, and longer put forth: another on the left side lesse, and moze beyressed. And those bunched partes make a certaine cauitie, or impzeion after the longitude of the body, to the posteriour seat of the Ventricle impzeied. For in what place the Ventricle respecteth the Vertebres of the backe, and the descendit trunkes of the hollow Veyne & great Arterie to them stretched, that it might fit it selfe euery where to the place there assigned, the posteriour region therof is inwardly, as into his owne amplitude, somewhat impzeied: although the Ventricle beyng drawne from the body, and blowne by, sheweth not the same.

Two Orifices hath the Ventricle, one whereby the meate and drinke is received, which consisteth in the highest seate of the left part of the Ventricle, because the stomach there fitly perforatyg *Septum*, might first grow vnto the Ventricle, and be made one common body therewith. The auicent Grækes do call this *xaphia*, but we (after the Latins) name it the vpper mouth of the Ventricle. And although it be in the left side, notwithstanding it cometh nearer to the middle seate therof then to the left side. Wherfore Galen sayth it is sited vnder *Macromata Cartilago*, as vnder a certaine propugnacle and defence.

The other Orifice of the Ventricle, transmitteth the meates chaunged, into the intrels. Whence the Grecians call it *σφαγος* the Latins *lanitor*, but commonly the nether Orifice, or mouth of the Ventricle. This Orifice is in the right side, and consisteth the begynnyng of the intrels. Hence it hapneth that the first intrell called *Duodenum*, many haue named the begynnyng.

Whereouer the Orifices of the Ventricle not onely in situation do vary, but besides, the nethermost is moze strete then the vppermost, because sometyne are swallowed hard, great, and vnbroken lumps: for whose ingresse, it behoued the way of the Ventricle to be large, and ample. But beneath (contrariwise) since no thyng passeth that is raw, hard, great, are not turned into iuyce, it is streter, although neither so strete, as that it onely transmitteth the thicke iuyce, since not a fewe, & that wout hurt or damage, do oft tymes, auoyde great swallowed bones.

But in diuers creaturres Galen affirmeth a certaine Glandulous flesch in the inferiour Orifice of the Ventricle, sited to augment his stretenes, chiefly when the Ventricle for concoction sake, vseth the retentive facultie. But in man no Glandule circumpacteth the nether Orifice of the Ventricle, as witnesseth *Colicibus Lib. 1. Cap. 4.*

The situation of the Ventricle.

The figure of the Ventricle. Why it is round, why the Ventricle is long.

The description of the Ventricle on both sides.

Where the Ventricle is impzeied, and the cause of that impzeion.

The Orifices of the Ventricle.

The vpper Orifices of the Ventricle.

The nether Orifices of the Ventricle.

What maketh the beginning of the intrels.

The difference between the vpper and nether Orifices. Why the vpper Orifice is larger then the nether.

The Glandule compasseth the nether Orifice of the Ventricle in man.

The stomach perforateth not *Septum transversum* in the way of the great Arterie.

Whence the stomach hath his thyrd coate.

Why the stomach in descendyng declineth toward the right side.

The stomach entereth not in the right side of the Ventricle. Why the stomach in descendyng crooketh into the left side.

Where the liuer giueth place to the Orifice of the stomach.

How moze speedy passage of meate throughe the stomach was prepared. The Glandules called *Tonsille*. The vse of those Glandules in the middle space of the stomach.

Where the stomach is with the Ventricle continuall.

The thicke<sup>st</sup> & swelled portion in the Orifice of the Ventricle.

Vesali loc. Cit. The use of this thicker portion.

Where the Ventricle hath asperities where not.

Colour.

Quantitie.

The action of the Ventricle.

The coats of the Ventricle.

Why the inner coats of the Ventricle is in the mouth harder than the Ventricle.

The Fibres of the inner coats of the Ventricle.

Loc. Cit.

The inner coats of the Ventricle containeth no straight Fibres, as sayth Galen and Vesalius.

The Ventricle receiveth the four naturall Vertues.

The use of the Fibres in the inner coats.

The Fibres of the second coats.

So not onely in the inferiour Orifice of the Ventricle, but also in the uppermost, the substance of the Ventricle is thicker, and the Orifices towardes the inferiour partes, obtaine a swelled, or moze extuberant part like a circle, wholly answerable to the substance of the ventricle. Which in dissecting the stomach beyng yet whole, is to be perceiued by feeling, but beyng opened, and turned cometh to sight, manifestly shewing the begynnyng of the Ventricle, or end of the stomach, and the begynnyng of *Duodenum*. But this thicker portion of the Ventricle is chiefly made to this end, that the mouth thereof might be made moze thicke and strong then the rest of his body, lest by force it be rushed ope, or broke of those thynges that passe downward.

As the outer face of the Ventricle is smooth, and every where playne, so, or rather moze is the inferiour concavities thereof, onely the aforesayd y. circled eminences excepted: for there the Ventricle (if it be vehemently drawne together) sheweth nothing but wrinkles saue onely a colour darke, & as it were with cloudes wavyng greatly red, intermingled: beyng on the out side (nevertheless) almost altogether white.

But very diuers is the quantitie of the Ventricle. For if after the manner of a bladder, it be blowne vp, it shall not be any maruaile to thee, that at one tyme, it can receiue such store of meates, and drinkes: albeit, by the constrictiue force it vseth, whether it containe litle, or much, it doth complect the whole, so, as no voyde space is left, but alway full as is the bladder. To this action is the Membraneous substance thereof agreeable, that fitly it might in tyme of neede dilate, as also aptly bynd together agayne when it is requisite.

The Ventricle consisteth of two broad and thinne coats together ioyned, & then as the stomach or throte, but somewhat unlike: for the inner coats of the Ventricle like as of the stomach, is sinewy, and Membraneous, and to the inner coats of the whole stomach, mouth, lippes, and guttes continuall, though from the coats of the mouth and stomach a litle, onely in hardnes, differing. Which was seemely, because we first coniect, and make ready in the mouth the rough and hard meates, before they be committed to the Ventricle, by which, the scope of the mouth, were not this tunicke thicke and hard, would be woene, & fretted, & therfore the coats common both to the stomach and ventricle, immediately as it cometh to the bottome of the ventricle, is made softer.

This is with two kindes of Fibres interred, or entwouen. Wherein also it varieth from the inner coats of the stomach. For the inferiour part of the coats, that respecteth the concavities of the ventricle, is endewd with many straight Fibres: for so (sayth *Vesalius*) it behoued the ventricle by them to draw, & sucke in the meate & drinke by the stomach. Galen before him also made the like affirmation. Fewertheless, *Columbus* herein hath not spared to confute them both, and that to vnderstand by what reason, if thou thinke it not tedious (gentle Reader) I will willingly employ my penne to expresse the wordes as he hath written them. Galen, and after him *Vesalius* supposed that nature had constituted straight Fibres in the inner coats of the ventricle, thereby that it might possesse the power of attraction, but what sooner is eaten the stomach bringeth into it, & therfore it stode in no neede of straight Fibres. Notwithstanding it is not destitute of the naturall vertues, which are also in other members, as attractiue, retentive, concoctiue, and expulsiue.

But the Fibres due vnto this inferiour coats of ventricle, which *Vesalius* calleth the second kind, are oblique, sited on the outside of this coats, where it is embayced of the second: by these is purchased vnto the ventricle, the needefull vertue of retention.

After this, as it was expedient, expulsion of the coniected meates should follow, like

like as after attraction, retention: so accordingly nature (put in the second or outer tunicke of the ventricle, transuerse, or ouerthwart Fibres, folded in also with some oblique for the outer coats, which is thicker and softer than the inner, beyng not so strictly compact and bound together) aboundeth with transuerse Fibres, and answereth to the second coats of the stomach, saue that it is lesse fleshy then this, and enterwouen with some oblique Fibres also.

To these two tunicles of the ventricle hapneth an other or third, as vnto them a propugnacle, borrowed from *Peritonaeum*, where it cometh to that part of *Sep-tum* that giueth way to the stomach. Wherefore *Columbus* sayd rightly, that there are two proper coats vnto the ventricle, and one common. And this portion of *Peritonaeum* first couereth the upper Orifice of the ventricle, and thence after the whole body thereof, even to the begynnyng of *Duodenum*, beyng of all the coats which it reacheth to other organs, the thickest, yeldyng likewise a begynnyng to the upper Orifice of the ventricle, as hath bene sayd before.

This coats first receiveth and furniseth, all the Veynes, Arteries, & sinewes that are reached to the ventricle. All which veynes haue their onely begynnyng from *Vena Porta*, and none or very few from *Cava*: but the Arteries all springing from those, which are scattered from the great Arterie first into the lower Membranes of *Omentum*, and so into the liuer, vessell of coler, spleene, and finally into the ventricle deriued.

The first veyne of the ventricle begynneth from *Vena Porta*, before the same be deuised into the two great trunks, runnyng to the lower Orifice of the ventricle, being thereto at the posteriour part thereof conterminat, or very neare ioyned. The Arterie associating this veyne is a branche of *Vena Porta*, which after the way of *Vena Porta*, goeth to the hollow of the liuer.

The second veyne is every where accompanied with an Arterie: it is stretched out to the whole halfe inferiour part of the ventricle, from which both the Anterior, and posteriour right side of the bottome of the ventricle, borroweth branching surcles. It springeth from the right side of *Vena Porta*, where the same is deuised into the two greater trunks: the Arterie being from that deriued, which is effused into the liuer.

The third veyne of the ventricle is very small, not associated with any Arterie: and springing from the left, and slender trunk of *Vena Porta*, is in the posteriour part of the ventricle, in small store of branches, dispersed.

The fourth veyne, goyng forth from the same trunk, and every where in his progresse purchasing the company of an Arterie, is, then all the veynes and Arteries ascendyng to the ventricle, far chieffer, and moze notable, and ordered in a great number of branches. From this veyne compassing about the right side of the mouth of the ventricle, a branch or stocke is put forth, reachyng after the higher side of the ventricle vnto the lower Orifice thereof. But the Arterie, the mate of this present veyne, is plucked out from that, which by the inferiour Membranes of *Omentum*, is stretched to the spleene.

The fifth veyne, beyng not depriued of the felowshipp of an Arterie, goeth about the left side of the bottome of the ventricle, and beyng propped vp with the superiour Membranes of *Omentum*, committeth branches from his highest seate to the Anterior, and posteriour partes of the ventricle. The original of the veyne is from the greater branch of *Vena Porta*, where the same to the lower part of the spleene is to be inserted: and the Arterie his mate, from the branch of the Arterie commyng to the spleene. Galen seemeth rather willing to call this veyne a certaine veniall passage or way, and in one place, a short vessell, whereby the spleene belongeth up into the ventricle, as shalbe sayd hereafter.

The sixth, is dedicated vnto the ventricle from those that are reached out to the spleene,

The third coats of the Ventricle.

The veltice of the third coats of the Ventricle. Whence spring the Veynes to the Ventricle. Whence spring the Arteries to the Ventricle.

Whence and Arteries of the Ventricle.

1.

2.

3.

4.

5.

6.

Vf. part. Lib. 4. Vf. part. Lib. 5. Vesali. Loc. Cit.



splene, and commeth to that part of the left side of the ventricle, that is neare the splene. And which beyne that is the chiefest, which taketh his begynnynge fro the greater bzaunch of *Vena Porta*, inserted to the higher part of the splene: from which, small surcles like beares commonly do reach vnto the vpper Orifice of the ventricle. Although there be not one but many beynes, which from the splene are to the left side of the ventricle deriued. Not omitting that to the sayd beyne, commynge to the left side of the ventricle, perpetually Arteries are topned in felowship.

The comon vse and office of all the beynes of the ventricle, is to bryng thereto nourishment, as also to cary y confected iuyce thence into the hollow of the liuer, no otherwise the the beyne of the intrels. Notwithstanding the principall office of the v. and vi. beyne, is, that by them the splene might poure forth into the ventricle melancolie iuyce, whereby (sayth *Fuchsius*) all the functions therof, which consist in a certaine kynd of embracing, are by his qualitie of taste, which is taste, & sowze, thereby of necessitie contractiue, & astringent, strenghtened: therfore neither may the meate, befoze it be fully confected, pzeasse to goe forth of the ventricle.

And albeit he proueth this to be the true, and legitimate vse of the melancolie humour to the ventricle, reiectyng wholly the iudgement of Auicenn, and consequently all others that speake of naturall appetite to be styred by thereby: yet *Columbus* since his tyme hath boldly confirmed it. I will not say how doubtfull herein in the mynde of *Vesalius* hunge.

But to proceede. The arteries of the ventricle serue to refresh the infested heat therof. Beside the which beyne and Arteries, no other vessell is to the ventricle implated: but if any of the wayes deducyng choler, come vnto the bottome of the ventricle, the same is most seldome sene. Wherfoze *Vesalius* protesteth but onely once to haue inuented the same: and that in a man of complexion most cholericke. And *Columbus* freely confesseth, that among all the bodies that euer he had dissected, his eyes might neuer attayne the speciall sight therof. Galen testifieth the same in his second booke of *Temperamentes* and his viij. Chapter.

Of sinewes, not a small payze is, from the vi. conuagation of the bzayme, prolonged downe to the ventricle. For after that the recurrent sinewes (in the Hypozoy of *Serues* exprested) haue poured out *Serues* and bzaunches to the inuolucere of the hart, and by the like also communicatyng with lunges, they immediately haile downe to y stomach, the right to the right, and the left vnto the left side: but the *Serues*, so sone as they haue a litle space descended with the stomach, committed onely thereto by the interuenture of Fibres, they both are deuided in two and the right with oblique bzaunches is caried to the left side as the left vnto the right: both which, accompanying the stomach, pearse through the midzief, not offryng thereto any bzaunch at all. But where the iij. bzaunches of the two *Serues* do touch the vpper Orifice of the ventricle, with diuers orders of branching they embrace it, reachyng straight downward surcles, with notable space betwene.

From the left *Serue* of the vi. payze embracing the right region of the mouth of the ventricle, a certaine notable bzaunch, after the higher side of the ventricle euen to the lower Orifice thereof, is deduced: which albeit that in the progresse therof it poureth out portions, and enuolappeth the nether Orifice of the ventricle with some surcles, yet is it not there wholly wasted, vntill further it haue crept into the hollow of the liuer.

But moreouer, vnto the lower part of the ventricle commeth two *Serues*, purchasing their begynnynge from the stockes of the first payze of sinewes of the bzayme, brought downe after the rootes of the ribbes: and beyng the mates of those Arteries, supported by the superiour Membran of *Omentum*, are digested into

into the bottome of the ventricle.

Amongest all whiche sundry portions of sinewes that the ventricle stode in made of, nature by none shewed such noble prouidence, as in those to the superiour Orifice therof inserted: which are not there in such manifold manner scattered onely to discerne annoyauce, at any tyme offred thereto by cholericke humors, or other of that kynde, but likewise that by them, as by riner, the animall force might be thereto dispensed, making the stomach to feele the needfulness of meate and drinke: and so consequently styrryng it to receiue sode, the same Galen sheweth in his fourth booke of the vse of partes.

The ventricle round about (as great fires to the cauldron) is compassed with heatyng organs, well ayding his concoctiue force. For the liuer completeth his whole superiour region towardes the anterior partes, and his right side, and the right Gibbous part in the posteriour seate. But the higher part therof, consyng to the posteriour seate of the vpper Orifice, and all the whole left side therof, is compassed with the midzief, onely that side excepted, with the splene on the left side of y ventricle, and lower posteriour part therof, occupieth. But in his hinder part the ventricle obtaineth the inferiour Membran of *Omentum*, and the vessels which therein are diffused.

Beside that, vnder his posteriour part, a part of the midzief, *Vena Cava*, and the trunkes of the great Arterie, beside the backe, and Muscles therof, do consist. But there is notwithstanding a great part of the Anterior region of the ventricle, which covered neither with the liuer, midzief, kell, nor splene, obtaineth here an other succour, in heatyng nothyng inferiour to y kell. For beside *Peritoneum*, and the viij. Muscles of Abdomen, there is a beyne from the nauell led vnto the liuer, whereby the child receiueth nourishment within the wombe, and which after tyme of byrth becommeth without blood, and vse.

To this beyne, where beyng knit to *Peritoneum*, it is layd ouer the ventricle in round circuit, much fastenyng, which, that the ventricle in his concoctiue office might moze swiftly labour, yeldeth there some helpe.

Neither is the ventricle as some haue fondly supposed, nourished by *Chylus*, which it engendzeth, since by the benefite of those faculties, whiche it obtaineth common with the other partes, it draweth to it selfe out of the beyne, and reteineth and labourerth proper nourishment, thrustyng out from it selfe what soeuer is superfluous. This also testifieth *Columbus*, sayyng no part of the body is nourished but by blood.

Finally by the giftes, by which the ventricle ministrerth vnto the whole body, and for which, some call it the kyng of the body, it receiueth meate, and drinke, by straight Fibres in at the stomach from the mouth, which immediately taken, is retained by oblique Fibres, and all a while embraced, vntill, by engendzyng in it selfe the alteratiue facultie, it haue conuerted the same into a thicke cream, or iuyce, in colour answerable to his owne substance: and at length, endeavouryng to put forth into the intrels that which it hath confected, it openeth the lower Orifice, and then by transuerse Fibres that which it embraced, thrusteth downward. Some tyme it vomitteth: but that motion is violent, and agaynst nature: for then the oblique, together with the transuerse Fibres do drine out, with great endeavour, and the straight Fibres of the stomach moue in opposite order to natures first decre.

And sithens the guttes are to this ventricle continuall, it seemeth, immediately to prosecute their description, a thyng of right required. Which as they take their begynnynge from the ventricle, so seeme they also one substance therewith, although a litle thinner. They are situated from the inferiour Orifice of the ventricle euen downe to the fundament, and occupy the greater of Abdomen.

The vse of the Arteries of the ventricle.

Galen.

8. How comonly by the ventricle is situated, and how it is assisted by the partes circumiacent.

The Umbilicall veyne.

The ventricle is not nourished by Chylus.

Lib. ii. cap. 4.

Vesal. li. cit. cap. 3. The operation of the ventricle. Receiue. Retayne.

Expelleth.

Col. Loc. cit. Vomiting.

Of the Intrels or guttes. Col. lib. cit. cap. 5.

Situation.

The office of the veynes of the ventricle.

Lib. 3. cap. 13. The way of melancoly to the ventricle. The vse of melancoly to the ventricle according to Fuchsius.

Columbus confirmeth the opinion of Auicenn. Lib. ii. cap. 7. Lib. 5. cap. 9. The vse of the Arteries of the ventricle. Of the wayes of coler to the ventricle. Lib. cit. cap. 3. Lib. cit. cap. 8. Galen.

The network of the ventricle.

Substance.

Vesiculi, Cap. 5.

The coats of the

Intestels.

In Defense the

inner coats of the

Intestels may

puttine and the

parry time.

Lib. 4. v. putum.

Vesiculi, Cap. 5.

Why the inner

coats of the intestels

is softer then

the same in the

Ventricle.

Why the inner

coats of the great

guttas is haroer

then of the small.

Fibres to the In-

testels.

Why to the strait

gutte and a col-

are somme strait

Fibres.

The third coats

to the intestels.

Where rest the

vesicelles come

to the intestels.

The figure of the

intestels.

Of the vessells to

the guttes.

Why to the small

guttas are more,

to the greater

fewer.

The use of the

new to guttes.

The division of

the intestels.

Columbus would

divide them into

II.

men. Their substance is Membraneous, yet not euery where alike in thickness. But such notwithstanding, as easily might embrace that which it containeth, and againe apte to be distended, or reched out by the thynges contained.

They haue two peculiar coats, and one, which they purchase from *Peritonaeum*, to make them lesse subiect to iniurious offence. Wherefore Galen affirmeth that the interior, by *Dysenteria* or other dayly griefes, sometime putrifieth, yet the outer being safe, some so affected do escape. The interior coats of the guttes is softer then the interior coats of the ventricle, for that they receive no rough or vnbroken thynges as doth the ventricle: but their outer coats is more thinne, and fleshy, yet lesse fleshy then the inner coats of the ventricle: because they are rather the instrumentes of distribution then of concoction. The inner coats of the great guttes is so much harder then the interior coats of the small, by how much they containe matter more hard and boyde of iuyce. For that which is contained in the small guttes is liquid, flowyng, and watrily: whereas that in the great guttes is hard.

Both the coats of the intestines haue orbicular Fibres, that they might drawe forth that which floweth into them more spädely: and there the whole iuyce is spädely sucked to the liuer. But the outer coats of the straight intestine, and of *Colon*, obtaineth straight Fibres: which are made as a band to the circular Fibres, lest happily they sometime, in forcing out the hard excrementes, might also together with them depart, and be plucked away. And for this cause chiefly so many of that kynde are bestowed on the straight gut, for that it amplexeth the dryer excrementes.

The third coats of the intestines is as a propugnace to the second, by whose benefite, and interuenture of *Mesenterium*, the intestels are bounde to the backe. This is taken from the Membrans of *Peritonaeum* securely carieng the vessells to the intestines. For these Membrans, together with the vesselles commyng to the hollow seate of the intestels, are dilated, there endewyng them with a third coats: Why the hollow side of the guttes is ment the part which the vessell first touch, and by the Gibbons part, the contrary.

They are created round in fourme, to be the more capacious, and lesse subiect to iniuries. But veynes and Arteries are not in like number giuen to euery one, like as not in all the intestels is equall stoe of iuyce to be sucked out. For by how much the intestels in continuitie are nearer the ventricle, by somuch they containe more of the best iuyce: therfore consequently, greater stoe of vesselles are to the small guttes distributed, and fewer to the great.

So are the guttes endewed with sinelues, that they might giue knowledge of euery hurtfull hūger. For, if they were altogether boyde of sense, nothing might resist, but that the guttes, either by yellow Choler, or other biting humour, might thzoughly be corrupted before a man should feele.

Moreouer although the intestels be one continuall body, notwithstanding, when they are circindured into diuers, and many enfoldes, and turnynges, and those differing in figure: neither chuse they in all places the same nature in situation, substance, and fourme. And agayne others are made touchyng some peculiar part in man: nether the principall use of them all alike. The learned Anathomistes, and such as haue bene in dissection expert, do number them as though they were moe. And first they denide them into small, & great: then either of them agayne into thre, so that all are in number vii. constituted (although *Columbus* if it were lawfull to starte from the elders, could contentedly stand to the first diuision) that is to say, *Duodenum*, *Tenuum*, *Tenne*, *Cecum*, *Colum*, and *Rectum*. All which in order we will speake vpo, so fone as we haue vnfolded the peculiar properties of the first diuision, that is, the office of the small and great guttes.

The

The small guttes (as witnesseth *Gal. Lib. 4. v. Partium*) are chiefly fourmed, that by their benefite, what soeuer iuyce is of the meate laboured by the diligence of the ventricle, the same might be drawne into the liuer, the Shoppe or stozehouse of blood. As also that the dregges, and such thynges as are vnapt to be drawne, might be duly excrened or auoyded. Last of all, to the concoctiue and alteratiue force the small guttes are somewhat assitaunt: as that the substance first concocted of the ventricle, they might a litle more absolutely chaunge. Neither is it to be denyed, that the meate, in the passage therof thzough the intestels, is more concocted, like as also in the beyne the blond, and in the hart the vitall spirite: which (sayth *Columbus*) is engendred by the labour of the lunges in the veniall Arteris, but after made perfect in the hart, as in the History of the spirituall partes is sufficiently touched. Wherefore, euery as Nature hath giuen vnto the beyne (which she framed for instrumentes of distribution) of the generatiue facultie of blood, euery so, and by the same reason, to the small intestels, made for distribution therof into the beyne, a certaine concoctiue facultie of meates is ioyned. Whyned, and turned with many foldes & turnynges, hath nature all the scope of the small guttes: to the end, that if any nourishment in the passage of the first anfract or turnyng do escape the mouthes of the vessells, to the inside of the intestels opening, it might chaunce into the second: but if it did passe that also, yet followeth the thyrz, fourth, fift, and others a great number. Wherefore for the streit and long passages, with so many turnes and foldynges, euery part of the meate is at length constrained to appropinquate the mouth of some one, or other of the vessells. Vnto as the whole gutte euery where round about, is replenished with an innumerable multitude of vessells: whose Orifices penetrate into the capacitie of the intestels, after the maner as shortly shalbe said. Of the which vessells is catched, what soeuer is profitable of the nourishment that passeth by. So as it cannot be, that any iuyce fit for the nourishment of the body, may slippe from the same vnprofitable. The foldes and turnynges therfore of the guttes, are to that end made, to yeld exact distribution of all the concocted nourishment, lest the same swiftly passyng away, and so goyng out, the body should be diuen into an vrgent necessitie of reseyuyng nourishment: whereby men should lead their liues in continuall neede, fulnes of belly chere. As for exaple. The creatures in which none of those foldes or turnyng, spoken of, are founde, but haue one simple intrell, or gutte from the ventricle to the fundament straight pretensed, we see to be rauorous, vnprofitable, and such as liue in perpetuall desire of eatyng. Not improuident by them did nature in mans body woake her effect in the intestels, with such anfractuious foldes as are euidet, that they might delay, and a while reteine the iuyce which floweth from the ventricle, vntill the miserableall beyne haue sucked in all that is commodious, and caried it to the liuer.

But the great guttes, although they be also to the distribution of the iuyces conuenient, notwithstanding particularly, because great is their amplitude or scope, and therfore able to gather together and containe many thynges, to the end that not immediately, but by long space of tyme we vse egestio. Also if any thyng shall escape this suckyng in the small guttes, the same whilest with longer delay the excrementes lye in the great, is haled forth by their vessells. But to speake of these particularly, that is to say of the singular partes and diuisions.

First all that part of the gutte, which vnder the ventricle from the inferior Orifice therof, straight (after a certaine maner) descendeth thither, whereas the gutte first begynneth to be infolded, because in man for the most part it holdeth the length of vii. fingers, is called of the Grækes *Δωδεκαδαντυλος*, and of the Latins *Duodenum*. There are (sayth *Vesalius*) which thinke not good to call this a gutte, but rather a rising, beggynnyng, or a Proesse of the intestels. This portion

Willij.

or

The use of the small guttes.

The small guttes ayde concoctiue and alteratiue force.

The blond to in the beyne perfected. Lib. 7.

The use of the foldes and continuall passages of the guttes.

Why man is so temperate in the hyng of fullnes.

Why some creatures are vnprofitable in eatyng.

How the iuyce is caried to the liuer.

The use of the great guttes.

The first parte called Duodenum. Situation. Lib. 5. cap. 5.

Why Duodenum hath no folde.  
Galen.  
Pyloron.  
Duodenum is the beginning of the guttes and not Pyloron.  
Lib. 3. Cap. 5.  
11. 1. Paradox. ca. 1.  
Vesicæ Arteries.  
Vesalius.  
Nerves.  
The benefite of coler to Duodenum.  
Euchsius.  
Cap. 5.  
Tholima.  
Col. Lib. 11. cap. 5.  
The progresse of Duodenum.  
Vesalius loc. cit.  
The use of the glandule vnder Duodenum.  
The second portion of guttes.  
Why it is called the hungry gutte.  
What maketh it euer empty.  
Collumbus affirmeth the way of coler to come vnto Ieunum.  
Loc. cit.

part *Duodenum* is led into no anfractuons foldes, as befoze of others is sayd, for asmuch as vnder the ventricule where it is caried, it obtaineth no spare place, or vacant roome in which it might aptly bowe, and infold it selfe. As also that it beboved it to giue place to *Vena porta* commyng from the hollow of the liuer, as Galen copiously mentioneth in his iij. booke of the vtilitie of partes.

The originall therof is therfore from the inferior Office of the vetricule, called *Pyloron*, and in diuers from the same. Wherfore to this purpose, Galen sayth in his fourth of the vse of partes. That *Duodenum* is the begynnyng of the guttes is not part of the ventricule, but some other part connect and knit thereto.

*Euchsius* therfore sayth, that they are much deceiued, which iudge no difference betwene *Duodenum* and *Pyloron*. *Duodenum* hath a veyne and an Arterie peculiar to it selfe, and which is caried directly downward after the longitude therof.

This veyne purchaseth his estate from *Vena porta* befoze it be inserted in *Mesenterium*. But the Arterie proceedeth from that, which is offered to the liuer. Nerves such as it hath, it receiveth from those, which come to the lower Office of the ventricule, and to the right side of the bottome therof.

Beside, the intrell *Duodenum* chalengeth that vnto it selfe, that the way of passage carieng yelow coler to the guttes, is implanted to it, that is to say, by the infuse of coler stimulatyng and styring vp the force of the guttes, to helpe their action beheimently, and to the expulsiue of degme within them insident.

But notwithstanding that thus *Vesalius* describeth a peculiar property to *Duodenum*, that is, the access of yelow coler vnto it, whereto *Euchsius* not onely subscribeth, but also sayth farther that they are farre deceiued, that affirme this passage of coler to be inserted to any other of the guttes, alledgyng further, with many wordes in the vij. Chapter of his thyrz booke, that whereas the occasion of this error seemeth to be take out of *Gal. Lib. 13. Therap. method. cap. 13*. It happeneth rather through imbecillitie of his interpreter *Tholima*, not perfectly vnderstandyng the sense or meanyng of that place. But howsoever himselfe vnderstande of that place, I will leaue to the learned to discusse. Onely this I say, that I say, that all are not agreed vpon this point that *Vesalius*, and he haue set downe without doubtyng, as more properly we may declare in describyng the next gutte.

The progresse of this portion *Duodenum* is thus, after the extorture therof from the ventricule, it descendeth towardes the Spine, whence agayne afterward it riseth, and giueth a begynnyng to the foldes or turnynges of the guttes, there endyng. So vnder it is layd a certayne Glandulous body to support, and shield the vessels proper to the same gutte, as also to irrigate, and moysten the amplitude, or scope of the same gutte with a certayne gentle humour: but because this intrell alone doth not receiue the rehearsed vtilitie, but in like manner also the other intrels: I will deferre their speciall explication till I take in hand to speake of *Mesenterium*.

Now the second intestine there begynneth, where is made the first conuolution or enfold. The Grecians call it *νῆστις*, the Latins *Ieunum*, and that because from tyme to tyme in dissection, in comparison of the other guttes, it is founde voyde, and empty. For the iuyce that it receiveth, it transmitteth most swiftly: for that choler not mixed with the iuyce floweth to the side of the intrell, styring vp by his sharpnes the vertue therof, to the immediate or speedy propulsion of that therein conteyned.

But then me thinke if it should but flow vnto the side of this, from the abundance of that which *Duodenum* hath, the chief effect therof should be more fene in *Duodenum* then in this, that is, *Ieunum* should neuer be found so empty as it, whereas alway this beareth the name of emptines aboue any other. And *Realdus Col.*

*Collumbus* writeth playnly, in telling wherfore it is called *Ieunum*, or as we may terme it the hungry gutte, which happeneth (sayth he) because the iuyce comyng hither is as yet thynne, and slowyng. Furthermore for the cause of the way of the vesselle of choler, which endeth at the begynnyng of this same gutte: without any mention of comyng to *Duodenum*. Also *Iho. Fernelius* sayth it auoydeth speedely fro it, by the sharpnes of choler, that floweth into it. So that it may reasonably be gathered, if choler worke his most speciall effect in this, that then his principal prospect is thereunto.

This gutte *Ieunum* is situated iust in the midst of the bellye, beyng thre next vnto the centre of *Mesenterium*, to the end that the armes or branches of *Vena porta*, and the great Arterie, might with a shorter iourney be poured out vpon it. But that *Rhazes*, *Mundinus*, *Alexander*, *Benedictus* and such others, that supposed this intrell to be no more turned or folded then the last of all called *Rectum*, were greatly ouertaken with error, there is no man that knoweth not.

*Ieunum* hath his veynes and Arteries in copious sort, from those which are reached forth to *Mesenterium*, from *Vena porta*, and from the vete of the Arterie, that fro the great Arterie taketh his begynnyng aboue the Arteries of the reynes. For few branches are diffused among the smaller guttes, from the arme of the Arterie, which begynneth from the great Arteries, after the goyng forth of the seminall Arteries. Neither are the vessels, as in *Duodenum*, led after the length of *Ieunum* vnder it, but as out of the centre of *Mesenterium* from beneath stretch vnto it, and straight forward into it, beyng thereunto with sundry sortes of branching, like the rote of trees, especially into the hollow part therof, implanted, openyng their mouthes into the inside of the gutte. Sinewes likewise obtaineth this hungry intrell deriued from the branches of the vi. payze of the bwayne, which are extended to the rotes of the ribbes. For from them two branches, on eche side, are sent to *Mesenterium*, and thence agayne into many partes broken, and deliuered to the intrels.

The thyrz intestine succedeyng *Ieunum* is called *Ileon*, of some *Tenne*, or *Grazile*, but most commonly *Ileon*, for the many foldes thereof or *Vesalius* and *Collumbus* do testifie. It occupieth the midst of the bellye as *Ieunum* for the same causes, and endeth at the begynnyng of the great gutte. But where *Ileon* begynneth it is no playne matter to expresse. For fro the begynnyng of *Ieunum* downe vnto the end of *Ileon*, is found no manifest matter, wherby to distinguish the end of the one and begynnyng of the other. For (sayth *Collumbus*) they both be of one substance, and colour. And no otherwise he can search the difference betwene them, then that the mesentericall veynes are more plentyfull, and great in *Ieunum* then in *Ileon*. These three intrels hitherto spoken of, are the small guttes, the other three that follow, the great: that is to say *Cacum*, *Colon*, and *Rectum*.

The fourth gutte therfore beyng the first of the great, is called by the auncient professors of *Anatomic* *Cacum*, that is the blynd gutte, because it is enuolued with one onely mouth. Hence it cometh that *Auicenna*, and some other later professors haue named it *Orbus*, or *Monoculus*. And they are farre deceiued, which not yeldyng to the auncient *Grecians*, doe deuise two holes or Offices therein, when as these two Offices, which they imagine, are not in the sayd gutte called *Cacum*, but in the extuberant begynnyng of *Colon*. For this in his left side hath ij. Offices: wherof the one higher is continuall with the small gutte, but the other lower is called the begynnyng of *Cacum*.

Wherfore this *Cacum* in mā is shorter then all other intrels, and much more narrow, and strete, then the narrowest part of all the other intrels, and like a thicke waine wound in foldes rather then a gutte: so that it seemeth scarce worthy to be accounted in the place of an Appendage of the guttes, much lesse ther, *E. i.*

Lib. 1. Cap. 7.

V. Vesalius.  
The situation of Ieunum.

The error of Rhazes.

Vesalius and Aretius.

How the vessels come vnto Ieunum.

Nerves.

The third portion Ileon.  
Loc. cit.  
Situation.

How the end of Ieunum from the beginning of Ileon is distinguished.  
The final guttes.

Vesalius.  
Why the fourth portion is called Cacum.

16. 3. tract. 7. Cap. 1.  
In Cacum are not ij. holes as some haue deuised.  
Colon in his left side hath ij. Offices.

Cacum is the shortest part of the guttes.  
Figure.

A Fashio citatus.  
How bntually  
this gutte is cal-  
led a sacke.

In what crea-  
tures Cæcum is  
large

Situation.

Wherem Cæcum  
in man is compa-  
red to the blind  
gutte in other  
creatures.  
What Vesalius  
vnderstand by  
Cæcum and what  
Columbus.

Lib. cap. 7.  
Where first the  
dregges begin.

Iulio Poll. teste.  
Why the 4. portio  
is called Colon.

Vesalius.  
The beginning  
and progresse of  
Colon.

The cause of er-  
rone in Mundinus  
and others.

Columbus.  
Mundinus his  
errour surmised.

Gal. loc. lib. 2.  
How the ventricule  
is offended by  
constit of Colon.  
Vesalius.

Columbus.

How it cometh  
that payne in  
Colon may seme  
to be in Reines  
and contrariwise.

foze in the number of the thicke intrels. And Iulius Pollux in his second booke, ac-  
compteth it rather and moze rightly an Appendaunce then a gutte. Farre wyde  
therfoze they do stray, which affi. me this blynd gutte to be as a certaine large  
and thicke belly, mete for the receipt of excrementes, and for that cause giue it  
the name of a sacke. But from the vfed authoritie of Galen, being ignoraunt that  
him selfe was deluded by Apes.

In dogges also this blynd gutte is much moze ample and large then in men,  
but in squirrelles and doome mife, it is answerable to the amplitude of their ven-  
tricle, and in dissection founde swelled out with dregges. And for that cause in  
such creatures rightly, it may purchase the name of a sacke, but in man other-  
wise: in whom that small portio of intrell and Appendaunce, not annexed to  
Mesenterium, but in it selfe folded, and cleauyng by the benefite of Fibres, is Ca-  
cum Intestinum, because that in order, situation, and fourme, though not in larges-  
nes, it agreeth with the blynd gutte of the aforesayd creatures, and hath one Office,  
whence (as is sayd) it first toke the name of Cæcum. But Vesalius opinion is su-  
specteu by Columbus, in that he is thought to haue giuen the name of Cæcum to  
this gutte for the Appendaunce sake: whereas he supposeth rather the elders  
to haue vnderstood by the name of Cæcum Intestinum, what soeuer is stretched fro  
the insertion of the small guttes vnto Colon. The which space (sayth he) in Dren,  
swine, doome mife, and squirrels is very notable.

Of this (sayth Fernelius) the dregges, and refuse in the belly haue their first  
kynde and name. For from the supres, whilst they are caried thzough the small  
guttes, is sucked and chosen all the most pure and vtile substance, the remnaunt  
are superfluous dregges: by which name they are first nominated, when as they  
come to this Cæcum Intestinum.

The first portio is called Colon a torquendo, that is to say of wythyng, for that  
most mighty paynes do consist therein, when as by regime or grosse spirite, it is  
obstruct, and stopped.

In the right side of Ilion, at the lower part of the right kidney, as a certaine  
great gloke swelling out, is that large and round beginning of Colon, which from  
thence by little and little straight stretcheth byward to the liuer, where, being  
strewed somewhat vnder the hollow therof, it toucheth the bledbar of coler, with  
which touching it is sometyne dyed: which perhaps was the cause of errour in  
Mundinus and others, supposing therfoze the way of coler had bene transposed to  
the intestine Colon. From the vessicle of coler it is brought forth of the right side,  
after the inferior region of the ventricule, and stretched vnder the bottome of the same  
ouerthwartly to Abdomen, but not aboue the ventricule as Mundinus dreamed:  
who craftely had surmised, that therfoze concoction in the ventricule was hereby  
assisted, whilst the excrementes in this gutte were deteined. Whence it cometh that  
herein a hurtfull humour holden, catcheth likewise the ventricule by consent, wher-  
by both appetite and concoction becommeth the worse. And somewhiles in dede  
it so affecteth the ventricule, as that the patient oft falleth into defect of mynde  
whilst he endeoureth to vnlod his belly. This agayne, after it hath touched  
the left side of the ventricule, it lightly obtaineth aboue the lower part of the splene  
certaine foldes, or inflexures, and so by little and little cometh vpon the left kid-  
ney crookedly, whereto it is bound. Forthwith besides inflected, it descenbeth, and  
in comyng to the left side of Ilion maketh two compasses, at length finishing  
his course at Rectum Intestinum in the toppe of Os sacrum. Hence also it com-  
meth that by the vicinitie or (moze then that) the tpyng of Colon to the kidney,  
Whist it is sometymes deceiued, imaginng the payne that is in Colon to be in  
the reynes, and agayne that which is in the reynes to be in Colon, as plentifully  
Galen teacheth in his 6. de affect. loc. ca. 2.

But

But to the end that the right, or greater trunk of Vena porta might be seated  
in the small guttes with moze iourney, and to transerre the mente to the liuer  
by moze abridged way: this intestine Colon giueth place to the small guttes, and  
procedeth as it were by distaunced places much from the centre of Mesente-  
rium. For which cause, the pzincipall portio thereof occupieth the left side  
of the body.

Howeuer this gutte in men is farre otherwise then in dogges, it is not exact-  
ly round, but all after the length thereof depressed aboue, and beneath, and on each  
side effourmyng a certaine rowe (as it were) of globes, and celles.

The Colon in his whole progresse, from the right side of Ilion almost to the left  
kidney, bynes and Arteries, like as to Icinum and Ilion, are implanted: that is  
to say, from beneath rising by companies byward: and to the inferior part ther-  
of from the right kidney, euen vnto the straight gutte bynes, and Arteries, like  
as to Duodenum, are reached. And perues both Colon, and the other great guttes,  
haue, with the small intestines common. Finally when nature had deuised this  
first portio of sufficient largenes and scope, she prepared for the same two Liga-  
mentes like to gyddes, of which she did the one higher, the other lower.

The first, last, and lowest portio of the guttes is called Longan or Rectum. It  
is called straight, for that it is not wynded or turned about in foldes. All of the  
great gutte, that descenbeth from the beginning of Os sacrum, downe to the funi-  
dament or seat, in men vnder the bledbar, in women vnder the matrice, is com-  
prehended vnder the name of Rectum Intestinum, in English the straight gutte. It  
hath bynes and Arteries from the branches of Porta, and the great Arterie: and  
of perues chalengeth his part among those, that are common to the other intrels.

But before I cleane breake of this description of the guttes note (diligent  
Reader for to Columbus willett) the notable deuise of nature, who in placing the  
intrels, first made of the great guttes as it were a certaine balley, and then sight-  
ly seated therein the small: the moze easely to shunne all extreme iniuries.

The body named Mesenterium, or Mesarcon, purchaseth both those names  
by accidentes. As first for the situation thereof, because it is sited in the midst  
betwene the intrels, and therfoze completeth them as a band. But it is named  
Mesarcon for his proper substance, containing all the bynes descending from  
the liuer into it, together with the nyght Arteries & perues: whence those bynes  
happe to be called Mesaraies, or Mesarae.

Therfoze in the hynder part of the guttes is placed this band: by whose bene-  
fite it might come to passe, that the intrels be bound together to the backe. It ri-  
seth from the Spine, and is begotten of two Membrans from Peritoneum, or is  
(as Columbus briesly spacieth) a doubling agayne of Peritoneum, betwene which  
reduplication the aforesayd vessels runne. Notwithstanding the originall of those  
Membrans is not from one and the same seat of Peritoneum, but others, accor-  
dyng to the fourme of the same Mesenterium, which the guttes almost do make, be-  
yng therewith bound together. For as the maner of euery inflexure of the guttes  
is not alike: so neither euery where alike shape of Mesenterium. Which Galen  
as it seemeth diligently noted Lib. de Ven. differt. For although in dede Mesente-  
rium be euery where one continual, he neuertheless hath recited thre as one the  
right, an other the left, and the thyzd the midst.

It appeareth that he calleth the midst that part of Mesenterium, which  
gathereth Icinum and Ilion to the backe: which springing with a narrow begyn-  
nyng, is brought forth into a marueilous amplitude and bzeeth, that it might  
grow to all the inflexures of Icinum and Ilion.

The right and left he might name, where it byndeth Colon and Rectum to the  
backe. The right in the region of the right Ilion, and left placed in the left. The

E.g.

part

Vesalius.  
How Colon sit-  
teth place to the  
small guttes and  
why.

The fourme of  
Colon.

Whereto Colon.

Natus.

Columbus.  
The 4. Liga-  
mentes that hold  
Colon.

Vesalius.  
The 6. portio  
of the guttes cal-  
led Longan.  
Situation.  
Dilectus.  
Natus.

Columbus.  
The notable de-  
uise of nature in  
placing the guttes  
in the belly.

Io.  
Vesal. cap. 6.  
Tablante Cal. de  
anat. adm. lib. 7.  
Mesenterium and  
why it is so na-  
med.  
What the beines  
in Mesarcon are  
called.  
Situation.

The originall of  
Mesenterium,  
Cap. 6.  
Vesalius.  
Fontine.

Division of Me-  
senterium.

Which is the  
middest.

Which is the  
right and left  
side.



How that part of Mesenterium is begotten that receiveth the small guttes to the backe.

Whence springeth the part knitting Colon and Rectum to the backe.

Why Mesenterion is of fleshy substance.

How the trunkes of Vena Porta entereth into Mesenterium. Whence the vessels come. Nerves.

The distribution of the vessels to the guttes.

How the Mesenterium fatteth.

Pancreas.

The office of Pancreas.

Situation.

The use of all the Glandules to the guttes.

How the third coat is made to the guttes. The use of the third coat.

part therfore of *Mesenterium* peculiar to the small guttes, chuseth in all respect the lyke begynnyng as doth the inferiour *Membran* of *Omentum*. For from the coates of the great Arterie and hollow veyne, whiche the same vessels in their whole progresse, after the Vertebres of the loynes, obtaine from *Peritonaeum*, *Membranous* Fibres in great number arise, immediately degeneratyng into *ij.* *Membrans*, the right into a right, and the left into a left. By these *Membrans* mutually knit together, that part of *Mesenterium* is efformed that byndeth the small guttes to the backe. But the partes connectyng *Colon* and *Rectum* together to the backe, springing from those regions of *Peritonaeum* after whiche these intrels are reached, *Peritonaeum* alway sendyng forth certayne Fibres thether, whiche do degenerate into *Membrans*.

Neither is the substance of *Mesenterium*, onely that it might bynd the intrels more strongly to the backe, made *Membranous*, but also for a certayne other great use, that it might safely gather together, and shied the secure course of veynes from *Porta*, and Arteries from *Magna*, ramifying in *ij.* intrels, so that neither whilst a man leapeth, or falleth they are confused or broken. For the greater trunkes of *Vena porta*, whereas *Mesenterium* about the region of the reynes springeth from the backe, is led betwene the two *Membrans* therof, associated with an Arterie, which fetcheth his begynnyng from the great Arterie, before the same disperse his branches unto the reynes, to the end it might be poured out into the intrels. Whether also are extended two *serues*, on each side one, made out from those branches, whiche from the *ij.* payre of the bryne are reached out to the rootes of the ribbes. So that the same great trunkes of *Vena porta*, and the sayd Arterie, together with the two *serues* do go vnder the centre of *Mesenterium*, makynge entrance betwene the *Membrans* therof, which mutually cleave together: and afterwarde, strapyng throughout all the region of *Mesenterium*, insert them selues to the intrels by innumerable branches. But beside this rehearsed Arterie, there is another certayne stocke derived from the great Arterie, which entreteth into that part of *Mesenterium*, that vnder the region of the veynes begynneth from the backe. And the exorture of this stocke is taken from the great Arterie, a litle vnder the begynnyng of the feminal Arteries.

Furthermore, even as man every where aboundeth with copious fatnes, so likewise in *Mesenterium* the plenty therof is spied, by bloud there sweatyng out of the vessels, and after converted into fat by the nature of the *Membrans*. So that beside the sinewes, and vessels, the *Membrans* of *Omentum* contayne likewise much fatnes betwene them.

But beyond all fatnes there is another thyng by nature added to *Mesenterium*, that is, a Glandulous body called in Grekes *Pancreas*, heretofore spoken of: so subserued, and circumposed to the singular scissions of the vessels every where, as that none of them by any mouyng may be dissolved or broken.

And therfore at the centre of *Mesenterium*, where of the vessels the first distribution is made, nature hath layd this Glandulous body, with all securitie to lead, & conduct the first derivations most notable branches of the vessels. To the rest of *Mesenterium*, for every branch she hath given some Glandule, as a firmament of the same division; neuer omitting their officiall duety in moppening the guttes. So that together with the beneficiall helpe of those Glandules, the *Membrans* of *Mesenterium* most safely lead the vessels towards the intestines, with no lesse vtilitie byndyng the guttes to the backe, and at length formally fashionyng a thyrd coate unto them all. As when the *Membrans* of *Mesenterium* deduce the vessels to the hollow part of the guttes, together with the vessels, they growe unto them, but thence either of them mutually departyng crape over by the sides of the guttes, and degenerate into a thyrd tunicle: by this occasion, both

byn.

byndyng them more strongly, as also for the vessels, constitutyng the safer propugnacle.

The next, and most notable neighbour unto the ventricle is the liver, the receiver of all concupiscible facultie: whom no man (for his vicinitie) may deny to be greatly assaunt unto the same, though his warlike complexion, and situation with the naturall nourishment of the bloud, wherof who can dispoze it the fountaine, although Aristotle would sayne haue proued the begynnyng of bloud to be in the hart.

Wherfore this veyne one of the principall partes in the body, leaueth vs to note how that it is first also engendred above other members in the body. For when the Umbellicall veyne is first engendred, thereto also first cleaueth and encreaseth the liver, the first instrument of the generation of bloud.

It is collocated immediately vnder the midriff, occupieng the greatest part of his inferiour seate, but in the right side of Abdomen, vnder the false ribbes: in which place it is fastened with two Ligamentes, of whiche the one is about the hollow veyne, the other is called a Suspensorie of a certayne division, wherein the Umbellicall veyne is inserted. These therfore do fasten the liver vnto *Septum transversum*. And although it be situate in the right side as is sayd, yet neuertheless it occupieth a great part likewise of the left side, whereas by the helpe of a strong Ligament, it is connected and knit to *Diaphragma*.

It is not in figure exactly round, and in man is a whole substance, not deuided into lobes as Galen verely supposed, although of that manner it be to be found in foure footed creatures. And the cause why in vs it is whole, and in them deuided, *Columbus* doth in this manner discusse, that man being of direct & straight figure, fourmed by the hand of the omnipotent, whith the hollow part of the liver couereth next, and immediately the ventricle/whiche coueryng from the right to the left side, occupieth the whole Anteriour region, & maketh that the ventricle suffreth no cold. Wherfore it is easily imagined, how finally awayllable are *ij.* binguetes, which some men minister vpon the sharpe Grissell, to amend the cold intemperature of the ventricles, whilst they increase but the heate of the liver vnder lying, and before boate of nature.

But againe to *ij.* purpose. The liver of foure footed beastes is deuided into many lobes, the apter to enclasp the ventricle as with the fingers of ones hand: which, if it should be whole, and they going prone vpon the earth, might by no means be brought to passe. But in byrdes for that they rather stand vpright, then go prone vpon the earth, it is onely into two partes separated. Wherfore in man no where deuided at all, but in the Anteriour part, and out side of the liver. Whiche was necessary there to be deuided for the admission of the umbellicall veyne. Vnder this also, where *Vena porta* goeth out, are two small eminences, necessary for the defence therof, lest the veyne, by the body of the Vertebres at any tyme, should be compressed. But neuertheless these eminences are neither to be called Lobes, Fibres, nor wynges.

The liver hauyng two partes the one exterior, and the other interior, hath the outer Gibbous or bossed forth, and smooth, but the other hollow, and rough like water banks. And that because that vnderneath it is placed the round bounched ventricle. It is circundated, and enuoylled with a thinn *Membran* of *Peritonaeum*, wherfore the extremities therof are not voyde of feelyng.

It is in substance nothing els but a heape of crudded bloud, interfered with many veynes, and some Arteries, and is a great member, the prince of Abdomen. Wherein some haue supposed naturall spirites to be engendred, but that sentence is not allowed: for, to be the fountaine of bloud (as is aforesayd) nature dedicated his office. Neither do I suppose that any man in these dayes doubteth

E. iij.

it

The liver the seat of concupiscible facultie. The liver is the fountaine of bloud and ayde to the ventricle. Gal. lib. 4. vi. part.

Col. lib. 6 de Recto vens. The liver is first engendred and how.

Vesal. lib. 3. cap. 7. Col. lib. 2. ligament of the liver.

Figure.

Why mans liver is not deuided into lobes as in beastes. Ibidem.

Topic medicinis are easily applied vpon the sharpe cartilage.

Why the liver in four footed creatures is deuided into lobes.

The liver in byrdes is deuided into *ij.* partes. Why the liver of man hath that onely division. Two Eminences vnder Vena porta.

The coate that smothereth the liver & queth it sense.

The substance of the liver.

Natural spirites are not begotten in the liver.



The originall of  
Vena porta.

Why it is called  
Vena porta.

The first branch  
of Vena porta is  
carried to the  
upper office of  
the ventricle,  
Vena Coronalis.

The ventricle is  
nourished by  
blood not by chi-  
lus.  
The spleen onely  
is nourished  
with excrementes.

The beme from  
the spleen to the  
ventricle carrying  
some iuyce to  
the stirring up of  
appetite.

Vena porta.  
The use of the  
lancoly to the  
stomach after  
Vena porta.

The use of the  
lancoly to the  
stomach after  
Collum.

Why some say  
others difficult  
doe suffice him  
get.

The mesentericall  
veines where  
they end in the  
intrels haue  
Membranes in  
their extremities

it to be the head, originall, and roote of all the veines.

**I**n the hollow part wherof springeth a veyne, called of the Grecians *σπληνική* of the Latins *Porta*, which, contrary to *Vesalius* opinion, *Collumbus* affirmeth continuall with the umbilicall veyne. The rootes therfore of *Vena porta* are diuerfly sowed in the hollow part of the liuer throughout his substance. And they be sufficient thicke, chiefly as touching their coates, and at length in one veyne do coite and ioyne together, so constituting a thicke trunk, or stocke: which afterward goeth wholly out betwene the aforesayd small eminences. Whiche therfore *Hippocrates* called *Portus*, as it were the gates for the issue thereof. But afterwarde under the ventricle.

It is deuided into many branches, wherof the first it sendeth to the upper part of ventricle. Of which branch one part creepeth after the length thereof, and an other embraceth about his Office is a crowne, and is therefore called *Vena Coronalis*.

The second branch of *Porta* goeth to the inferiour part of the Ventricle, and hereafter his longitude is deuided and distributed. And hitherto are these branches of veines committed, so that by their blood the Ventricle might be nourished: but not therefore nourished with the iuyce *Chilus*, as some fondly haue dreamed, whiche being ouer thicke, also containeth in it selfe all kinde of excrementes. Neither is any part of the body (the spleen excepted which is nourished by melancolic humors) purged by any excrement. The third branch of *Porta* goeth forward to *Opuntium*, and there in sundry sort is scattered.

The fourth is conueyed to the spleen, to transport thither the melancolic humour from the liuer. And this is a branch sufficient great, and runneth under the ventricle, where nature hath bouldred the same with many Glandules compiled together, lest it should touche the bodies of the Vertebres, or at any tyme be compressed: thence therfore it riseth, and denideth the longitude of the spleen, therunto entering. From this veyne springeth an other, small in forme, in other greates, and agayne in others greater: this climeth up towarde the Office of the Ventricle, and there endeth. Although sometyme it is to be noted not to ascende so hygh. The office of this veyne is to drinke, and poure out of the melancolic humour into the Ventricle: and that to this end (sayth *Vesalius*) to strengthen all the functions thereof by the qualitie of his salt, which is sharpe and soluer, therfore byndyng, and drawyng it together in it selfe, and also of nature, forbyndyng the meate to slippe out of the stomach before it be fully concocted. And this (sayth he) is true, and very lawfull use of the melancolic humour, brought vnto the stomach, denyng to what end, or how it may serue to prouoke, and stirre appetite in the stomach continually. Which argument *Collumbus* hath agayne (notwithstanding) approued and fortified, saying that without the same, we should in our great affaires and busines forget to take our meate: whiche might purchase decay, and weakenes in our bodies. And further affirming that in who this veyne is larger, in such hunger may lest be suffered: and in such as haue it lesser, they may better endure abstinence.

The 5. branch of *Porta* is sent to the intrell *Colon*.

And the 6. greatest of all, to the small intestines.

The 7. to *Rectum Intestinum*, and these are the principall branches of *Vena porta*. Of the which those iij. which are sayd to be transferred to the intrels, wher in they come into *Mesenterium*, there they are deuided into the infinite number of Mesentericall veines: whiche do not onely embrace the intrelles, but also pearse through into their inner cauitie: wheras most aduised nature hath giuen to the extremities of euery of them a Membran, like as in the bleedar, to the extreme endes of the Mesentericall vessels: which both giue passage to the vyne descendyng

ing into the bleedar, and also prohibite that vpwordes none may returne agayne. The same wyke also esteeme that nature hath wrought in the extremities of these Mesentericall veines. Which no man before *Collumbus* hath inuented, although all together confesse that the office of these Mesentericall veines is to draw the iuyce *Chilus* from out of the intrels: but in neglectyng to follow the end of them, they sayled also to finde the great industry of nature, that is, by what great pollicie and arte she framed them: first that these veines might easily receiue, and drawe the iuyce *Chilus*, and immediately being receiued, that these little Membranes mentioned, should prohibite the egression thereof agayne. And if thou aske what *Chilus* is, as one not yet possessing full knowledge thereof, know that it is a conuersion of meate and drinke into a matter like to the substance of milke, which after it is past the Ventricle, descendeth still the turning wayes of the intrels, untill these haue sucked forth whatsoever iuyce is good and profitable. And for because that to his office neither foure nor yet v. veines were sufficient, nature created an unnumerable sort, and these in the upper ventricles much more great, and plentifull, but the more descendyng, so much the more thinne and scarce. Neither did necessitie require them so much in the last intrelles, because *Chilus* is there now turned into dregges, and hard excrement.

As yet there remaineth another branch to be described, whiche is also to be numbred among the branches of *Vena Porta*, notwithstanding that it is deriued from that which is dedicated to the spleen: and descendyng on the right side through *Mesenterium*, goeth downe to the extreme end of *Rectum Intestinum*, there making the Hemorrhoidall veines, which purge the aboundance of melancolic humour. And thus much of the originall and description of *Vena Porta* is sufficient.

The generall use both of *Vena Porta*, and his branches, is to bying the iuyce *Chilus* into the hollow of the liuer, and throughout his substance to disperse it: there agayne to be digested, and conuerted into red blood like the substance thereof. In which digestion are two excrementes engorged, as choler both Citrin, and blacke: Of which yellow choler like vnto the fire, is receiued of a little vessell, which nature in the hollow side of the liuer hath collocated and ordained: but the melancolic iuyce is sent by the fourth branch into the spleen, to nourish it.

Further, although these veines were forgotten for the translation of *Chilus*, neuertheless, they haue also another use, no lesse necessarie: since they carry with them the blood, that nourisheth the ventricle, intestines, *Mesenterium*, and *Omentum*. But this by the way, *Collumbus* wiseth vs to note (though agaynst the minde of Galen) that in these veines is not the vertue of making, or transforming blood: whiche is easie to discerne, to such as diligently marke the white substance, and thinn coat of the veines. For by what meanes may *Chilus*, by their tenuitie and whitenes, it being also white, and thicke, be turned to pure red, and thinn blood: whilest nature hath eche where ordained, that euery member of mans body, that hath the office to conuert any thyng, both transmute, & chaunge it into his owne colour, as is to be noted by the testicles and womens breasts. Also the Ventricle sheweth it playne, for whether the meates that we eate be white, red, yellow, greene, or other colours, all those notwithstanding it conuerteth to white, the colour of his owne substance. Here also the testicles, &c.

**B**ut now in the Gibbous part of the liuer, where the substance thereof is much greater, and thicker, springeth a veyne called *Concava*, *Chilis*, or *Magna*, being the mother of all other veines in our body. To this are diuers thicke and great rootes, which are inserted in the substance thereof from the toppe to the bottome, and do all at length constitute that large veyne, which is extended and ramified both up to the head, and downe to the foote. This veyne is rightly compared

The great industry of nature touching the election of all veines vnto no other, but to those before *Collumbus*. What *Chilus* is.

How the digestion of *Chilus* is made.

Why there are more veines in the upper then in the nether intrels.

8.  
The Hemorrhoidall veines.

The use of *Vena porta* and his branches.

The generation of yellow and black colly.

The aforesayd veines haue a double use. *Collumbus*. Cal. vi. part. What veines do not make blood.

Euery thing that altereth chaungeth that, that is to be altered into his colour. The Ventricle chaungeth all meates into white.

The veyne called *Concava*, *Chilis*, and *Magna*.

All the partes of the body are nourished by blood.

The coming of Vena cava to the hart.

Coronalis vena in the hart.

The rising of the beyne without a fellow called Aszygus.

The Intercoftall beynes.

Beynes sent from the beyne without a fellow to nourish the left side.

The beynes that nourish the vertebres and spinall maye.

Beynes called Axillares.

The rising of the beyne called Cephalica, or Cephalica.

In what place Cephalica and Basilica are united, where is the new common beyne.

pared unto a great riuer. For from thence as there be many dikes issuing, so be many bzaunches are deriued from this beyne, like little brookes, and running dikes, which are spread abroad throughout the whole body, transporting blood to euery Membran, of late made, and labourd in the liuer.

This *Vena Concaua*, in ascending vpward from the liuer toward the head, perfozareth the midriff, in what place it is distant from the bodies of the Vertebres, and in that place putteth forth two beynes, which, agayne deuided into bzaunches, are distributed throughout the same *Diaphragma*. Which done, this *Vena Cava*, running almost immediately to the right eare of the hart, is set vpon the Orifice of the right ventricle of the hart connect, and knit therewith, completing it euery where on the outside, not beyng caried into it.

In this place it bringeth forth a beyne, which compasseth, and embraceth the hart like unto a crowne, wherfore accordingly it is called *Coronalis Vena*.

Furthermore this hollow beyne ascending vp towardes the head, is caried by aboue the lunges, & there distant from the Vertebres. And aboue the hart no small space, thrusteth forth the beyne without a mate, called by the Greeces *αζυγος*, which although it be in the right side, yet hath his begynnyng from the middest, as it were the centre of the hollow beyne, which is reflected neare the bodies of the Vertebres, and downe to the extreme part of the brest descendeth, sending bzaunches both on the right and left side to the spaces betwene the ribbes, for the nourishment of those partes. And although this stocke lye in the right side, yet neuerthelesse vnder the lunges, *Esophagus*, and great Arterie, are bzaunches, thence scattered, to cherish and feede the left side.

From the same right trunk or stocke, whilest it begynneth to be reflected, breaketh of an other bzaunch, which ascending vpwardes, dedicateth bzaunches to the superiour spaces of the vpper ribbes, and not onely in the right side, but in the left also, except in some, and those very few, in which a little bzaunch is deriued on the left side from *Vena Axillaris*, and caried now to two, now to three, and sometyme to one of the spaces betwene the ribbes onely.

From all these beynes nourishing the spaces of the ribbes, as is sayd, there spring yet other beynes, which go in betwene the Vertebres, where the holes be for the production of Nerues. These beynes nourish the sayd Vertebres, and spinall maye, and enter in at the holes sited behynd the bodies of the Vertebres. From these further, before they enter in the spinall maye to nourish it, beynes are also sent to the Muscles of the skynne and backe.

Moreover aboue the beyne without a fellow, the hollow beyne ascendeth, lyeng a lott & rough Arterie, straight by the height of the Cannell bone, there putting forth y. great beynes called *Axillaris*, because they go vnder the armehole: which betwene the Cannell bone, & first ribbe, do passe by the caviitie of the brest.

Then after from him stretcheth the humerall beyne called also *Capitalis* or *Cephalica*, which neuerthelesse ascendeth not to the toppe of the shoulder: but rather is caried after the inner region, and passing forth betwene the first and second Muscle of the shoulder, stretcheth to the outer partes, and there lyeth euident aloft. For when it is passed through the fleshy Membran, it goeth betwene it and the skynne to the cubite, and is caried outwardly neare to the first Muscle that boweth the cubit: at which bought it deuident in two bzaunches, wherof one goeth to the inside of the cubite, and in departing from the bought therof it is united with an other like bzaunch of *Basilica*: of which two is made the true common beyne. But the other bow of the asofesayd beyne, in the outside of the cubit, both aboue & outward produceth many bzaunches: but at length, the chief bzaunch stretcheth aboue the wryest, and extreme part of the hand, betwene the little finger and the ring finger, and this diuision is caried to the extremities of either of those

those fingers. And this is the beyne commonly called of each Practitioner *Sabatella*, the opening of which they beleue to profit much in the effectes of the spleene. To which (of truth) me seemeth no reason can consent.

After that this *Vena Axillaris* is gone from out of the hollow of the brest, and hath committed from him this beyne lately described, it plungeth it selfe deeply vnder the Cannell bone at the Proesse of the scaple called *Anchiroides*: in which place it obtaineth very many bzaunches, which nourish the first Muscle of the arme, and not onely it, but also the second of the scaple bone, and the second of the brest, and the fourth, and seventh of the shoulder, and the scaple it selfe, and all the space euen to the Abdomen. Besides these, in women, you must vnderstand that other bzaunches are conuenient to the nourishing of the brestes.

Furthermore this *Axillaris Vena* beyng caried to the shoulder, vnder the first Muscle bowing the cubite, is deuided into iij. and those notable great beynes. Wherof one is called *Basilica*, or *Hepatica*, the inner beyne (after Hypocrates) of the cubitte.

This beyne, which we haue said to pearse so deepe, cometh aloft by little & little to the extreme end of the shoulder bone: & where the cubite boweth, like to *Cephalica*, it is deuided in two, wherof the one is united in the inside of the cubite with a bzaunch of *Cephalica*: in which place is made the common beyne. That is to say, common, because it is partaker of both the beynes. Which bzaunches constituting the same, are called *Mediana*, most commonly opened of euery Practitioner. But here is to be noted, that neare to *Cephalica* & his *Mediana* lyeth no nerue, so as there both to *Basilica*.

An other bzaunch is poured forth by the exterior part, and diuersly conioyned: for now with a bzaunch of *Cephalica*, now with the common beyne *Per Anastomosis*: at length it sendeth bzaunches aboue the wryest and backe of the hand, as also to the middle finger and fourth finger.

The other apparant beyne, which is called common, in the middest and inside of the cubit is caried obliquely aboue *Radius*, and fōdy wayes deuident, sendeth a bzaunch betwene the forefinger and thombe, and betwene the forefinger and middle finger, and coasteth at the endes of them. And this bow was wont to be opened in affectes of the head. But of the other two great beynes called *Axillares*, the one lyeth sufficient deepe, and vnder it fine perues, it is little distant, but rather toucheth the bone of the shoulder, and sendeth out bzaunches to nourish the two Muscles that bow the cubite: then forthwith runneth betwene the first, and second Muscle, and aboue the bought in tripple sort deuident: there committing a sort unto the inner Muscles of the cubite. When searching further, is inclined to the wryest, and vnder the Ligament haue recourse unto the ball of the hand, not sparing there to dedicate furcles for the nourishing of these Muscles which are in the end of the hand: besides that to euery finger they apply two little beynes, which after their sides to their extremities are caried. An other bzaunch passeth at the bought, by that Ligament that is sited betwene *Cubitus* and *Radius*, and is distributed to the exterior Muscles. The other *Axillaris* in the middes of the shoulder is reflected toward the posterioir part, limiting bzaunches to the Muscles extending the cubite. Afterwardes it tendeth moze downward to the longest Muscle and to the two horned Muscles, and to those Muscles, which haue their begynnyng from the outer tubercle of the shoulder, and so is it among these Muscles dispersed.

In the same region vnder the Cannell bone, where is the begynnyng of the *Axillares*, thou mayest also see spring foure descendēt beynes, wherof two descend vnder the bone of the brest, in the side partes neare the Cartilages of the ribbes: those go downward, and passing beyond the brest do march through the

The extreme of the brest, the opening of which they beleue to profit much in the effectes of the spleene.

The brestes are supplied with blood from the brest, the opening of which they beleue to profit much in the effectes of the spleene.

The beyne called Basilica, or Hepatica, the inner beyne (after Hypocrates) of the cubitte.

The common beyne vnder the cubite is called.

Mediana Vena. After here Cephalica and Basilica lyeth a Nerue.

The beyne accustomed to be cutte in diseases of the head.

The foure beynes to the mittles of the Abdomen.

P. i.

straight

Straight Muscles of Abdomen, whiche in some women are ioyned with an other beyne, whiche from the inferiour part riseth to the same Muscles. These descendyng betwene the fourth and fift ribbe, sometyme higher, & sometyme more crooked, direct them selues to the outer part, in men to nourish the Anterior Muscles, and in women not to that end onely, but for the generation of milke, being dispersed in their pappes. The other two go downward above the hollow of the lunge, neare to *Mediastinum* and above *Pericardium*, together with ij. Perues, which are brought to the Tendon of *Diaphragma*.

Sometwhat higher appeare foure Jugular beynes, two outer, and two inner: the two outer immediately above the Canell bone, scatter the twiggies unto the Muscle *Epomyda*. And the stocke or trunk after the scapple bone rising obliquely by the sides of the necke, sprinckleth forth partes to the Muscles scruping the head, and after the hinder part of the head upward to the skinn of the head, & to that part of the outer *Jugularis* which is left. Above the nether iaw it offreth it selfe to the Muscle called *Masseteres*, & obliquely is caried through the middell of the face to the greater corner of the eye: neuertheless distributing some bzaunches to the Muscles of the face, sendeth a beyne into the corner above the roundell, and that through the Muscle constringing or pulling together the eye lidde: the remnaunt ascendeth betwene the eye browes to the skinn of the head. But this note, that in some betwene the eye browes the left with the right is ioyned, and agayne disioyned.

The other Jugular beyne is sufficient great, caried byward towardes the seate of the Scull by the Anterior partes of the ouerthwart Processe of the Vertebres of the necke, neare the rough Arterie.

The beyne whiche we now speake of, vnder *Larinx* putteth forth a notable bzaunche, with whose twiggies the Glandules and Muscles of *Larinx* are nourished: the same beyne is also diuersly deuided vnder the inferiour iaw. Notwithstanding the diuision therof is lesse whē it cometh to the Glādules vnder the care, scruping to *Hyoides*, and to the tongue it selfe: and that beneath. This beyne the Philitions commaund to be opened in the disease called *Angina*: the rest of this beyne is distributed to the iawes & also to that tunicle that inueth the mouth.

The greater trunk of the sayd beyne entreth the Scull through the vnequall hole, by which the vj. payre of sinewes of the bzaune descendeth. But being entred, immediately it is conuerted to the posterior partes, and sent into *Dura Mater*: but carrieth his tunicle with him, and ascendeth by the hinder part of the head, vnto the toppe almost of the Labdall Suture, in which place, the right side with the left is ioyned, and *Dura mater* duplied. From the posterior part it is caried to the forehead by the supreme part of the bzaune, and inserted in the round hole betwene the forehead and *Ithmoides*: in the hinder part of the head, where the beynes did coite and ioyne together in one, it is admitted into the quadruplication of *Dura mater*. And frō thence ij. beynes go forth after the whole longitude of the vpper ventricles, which bzaunchinges nourish the substance of the bzaune.

But the quadruplication of *Dura mater* aboue mentioned, is called a presse, & lyeth betwene the bzaune and *Cerebellum*.

Agayne, the beyne goyng by the superiour longitude of  $\frac{1}{2}$  bzaune, constituteth a marueilous cell or cauitie. For aboue it sheweth the playne paterne of a halfe circle, but hath beneath ij. corners, whiche in this place are sometyme larger, sometyme streter. It spreadeth it selfe in a diuers fashion: and the bzaunches of it after they haue perforated *Dura mater*, are ramified abroad through the thinne *Membran*, all about it, and in diuers sorte now byward, now downward. But when they are passed through the thinne *Membran*, they enter the substance of the bzaune it selfe.

And

Asd here my Authour supposeth this will seme selues vnto the Reader, because before him neuer any found out, that beynes and arteries entred the substance of the bzaune. Vnder this substance of the bzaune the inner *Jugularis*, before it enter the Scull, sendeth forth his portions by the laterall partes vnto the temporall Muscles, and in the Scull it selfe to the sides of *Dura mater* next to the Canell bone. This beyne bringeth forth an other little beyne, whilost it ascendeth after the transverse Processe of the Vertebres of the necke, and putteth forth bzaunches to the nourishment of the Muscles of the necke: the same in some bodies springeth from the beyne *Axillaris*.

But where betwene the Vertebres of the necke Perues go forth, whether this beyne hasteneth, to the nourishment of the Vertebres and *Spinall marcy*. Vnto the first Vertebre it runneth towardes the hinder part of the head, where the hole is euident that pearseth to the organ of hearing, which it entresth to nourish all the same organ. And by this inner *Jugularis* are all the bones of the head, with the upper iaw, and nether, cherished: neither is there wherefore to expect the description of any other peculiar bzaunche of a beyne to serue vnto the teeth onely.

From the liuer his proper fontaine, it cleaueth to the body of the Vertebres on the right side, and after the goyng forth therof a little beneath the liuer, putteth forth a small beyne to nourish the partes adiacent, and is diuersly deuised. Afterwardes the same trunk goyng downward, putteth forth ij. beynes called *Emulgentes*, which are ended in the beynek. But beware thou esteeme not these to be alwayes onely two, since sometyme thou shalt finde them deuised into thre, yea foure, somewhiles five, albeit not commonly so noted of other writers.

Galen principally, and also diuers other Anathomistes haue vsed heretofore long discourse of twozdes, as touchyng the putting forth of the *Emulgent beynes*, anouchyng the right beyne to be higher exalted then the rest, and for what cause: though in dede in bayne. For since truth is contrary vnto them somuch, as that they would by pollicie inuent the reason of that which is not so, both the proposition, and argumentes of force must fall together, like him that whilost he more endeuoreth to decke the toppe and sight side of his house, then hath care to set firme his foundation, his time, and coite both perish together. Wherefore *Columbus* saith, the reasons of Galen are more ingenious then true, as touching the body of man (frō which no part of these my labours by my wil shall swarue) whose beynes *Emulgentes* thus we will describe.

From  $\frac{1}{2}$  left side of *Vena cava* vnder the vetricle, sheddeth out a large beyne, & sufficient long, called *Emulgens*, which is caried aboue the body of the turnyng ioyntes, and the Arterie *Aorta*, folowyng to the middell of the left reyne, whiche is in man somewhat higher the right, and that for the litleenes of the spleene, which not resistyng vnto it (as both the liuers greatnes on the other side to the right kidney) leaueth it in the higher state, the right being compelled to stand lower. But after it is come vnto the reynes by the aforesayd meanes, it entresth the body therof, there being amplified and cut into bzaunches, which throughout the substance of the reynes are distributed. Neuertheless, *Columbus* would not haue vs thinke of these to be made the searse, whereof Galen esteemed so much, and that through it the Urine is streined, and it being dilated blood to be pissed.

Were in dede nature (sayth he) might haue bene able to place *Membrans* as to the *Spinal* veins, and to the endes of the *Vegetes*: but, because this seemed more conuoluous vnto it, there are certaine eminences begotte of the same substance of the reynes, which entring into the same bzaunches, resist that the blood, which together with the serous matter is deduced to the reynes, should naturally slippe forth agayne. This notwithstanding being noted, since it is notable,

P. ij.

When

it now going to the other *Thrombica* below *Columbus*.

The beyne nourishing the bones of the head, with upper iaw and nether.

The course of *Vena cava*.

The beyne called *Emulgentes* not alwaye alike in number.

Galen in bayne vsed reasons as touching the situation of the *Emulgent beynes* as touching mans body.

*Coll. de Epate*.

*Coll. libidm.*  
The description of the *Emulgent beynes*.  
The situation of the kidneys.

There is no such searse in  $\frac{1}{2}$  reynes as others haue feigned.

How blood hath to be made with Urine.

The beyne which in men nourish the anterior Muscles of Abdomen: in women moreover engender milke.

The beyne to the Muscles and skinn of head, and partes of the face.

Of the beyne to the eye browes ioyned & agayne disioyned.

The progresse of *Jugularis Vena* toward the seate of the skull.

The beyne nourishing the Muscles and glandules of *Larinx*.

The beyne that is opened in the disease called *Angina*.

The beyne sowen in *Dura mater*.

Beynes nourishing the substance of the bzaune.

The part in the bzaune called the presse.

The beyne constituting a marueilous cauitie.

The ramification of beynes through the hard & thinne *Membran* and entring into the substance of the bzaune.

The vse of the Emulgent beynes.  
The Vinarie beft  
felt named vterer.

When nature enduozeth to thrust downe any stone, that commonly is boke with such force, as that it sendeth out great stoe of blood together with the vyne.

The vse of these Emulgent beynes is to purgethe blood of serbus substaunce, and to the reynes to yeld due nourishment. From this beyne springeth a vessell called Vreter, that is *Vrinarius*: it springeth in very deede from the body of the same reyne, there it taketh Vrine, and bringeth it to the bloodar.

In the right side the same Emulgent beyne is sited lower then the left, and shorter farre: for betwixt the hollow beyne and the right kidney is final distanced, yet is it set to in the same order as the left.

The left Seminall beyne.

There springeth from the left Emulgent a beyne called *Seminallis*, or a seede beyne, whiche obliquely vnder *Peritoneum* descendyng, and carped aboute *Os Pubis*, is reposed in the testicle, as moze apertly among the generative partes is discussed.

The false opiniō  
of other Anato-  
mistes as con-  
cerning the begin-  
ning of the Semi-  
nall beyne.

But this marke by the way, that this springyng of the Seminarie beyne is not from the Emulgent to carie the serous humour to the left testicle wherby the feast of *Venus* might with greater pleasure be celebrated, as many of the auncient Anatomistes heretofore haue deuised. For (say they) nature therfore determi- ned the begynnynge of one of these Seminall beynes to be so farre of, to y end that in the acte of coiture, the tricklyng downe of the humour so long a scope; should onely be to purchase the greater delectation in that present tyme.

Col. libid.  
The true cause of  
the beginning of  
the Seminall  
beyne.

But the true cause (sayth *Realdus Columbus*, is the littleness of the sayd beyne, which if it should haue sprung out from the body of the hollow beyne as the right doth, because it should then haue gone ouer the great arterie, it should euer haue bene in daunger in euery great dilatation, which the same Arterie must needs make, to be broke. Which incommōditie to pzeuent, prouēt nature deuised a neede- ful meane: willing therfore that from the left Emulgent beyne, and not from the body of the hollow beyne, the left Seminall passage should take his begynnynge.

The rising of the  
right Seminall  
beyne.

Contrariwise the right Seminall beyne floweth out from the fountaine of the hollow beyne, the space of y. or iij. fingers bredth vnder the right Emulgent, which first descendeth obliquely, then is caried vnder *Peritoneum*, after aboute *Os pubis*, but lastly endeth in the testicle.

And this is the race of the Seminall beynes in men, with a moze likely con- iecture then among the auncientes was knowne, or imagined: who would by their assertion proue (as it seemeth to me) that the longer the Seminall beynes were, the greater delite had the body in the act of generation. Which if it be so, then proue they also, that men hath moze pleasure in the vse of venerie then the woman: whose Seminall beynes hauing the like begynnynge and endes, yet but halfe towardes the length of those in man, for that her testicles are sited within the body, neuer commyng to the toppe of *Os sacrum*. But it is marueilous, vnder the right Seminall beyne, to the fourth Vertebre of y loynes, to be no beyne sent vnto the superiour partes but onely to the inferiour partes. For from the li- uer downe to this place, betwene the Vertebres, where the Spermes go fourth, the hollow beyne profereth portiois, which both nourish the Spinnall marey, and the body of the Vertebres;

The length of the  
Seminall beynes  
maeth not the  
greater delectatiō  
in Coiture.

Neuerthelesse immediately, as *Vena cava* is come vnto the fourth Vertebre of the loynes, it is deuided into ij. notable armes, whiche obliquely beyng carped aboute *Os Ilium*, and *Pubis*, make their iourney downewardes the one to the right, the other to the left legge. From the which diuision, first spring beynes sufficient great, which downwardes abroad, but first towardes the fundament, disperse them selues. For where the same diuision cleaueth to *Os sacrum* he tra- smiteth his armes through the holes therein to the Spinnall marey, to the same *Os sacrum*, and to the Muscles sited in the loynes, whiche take their begynnynge from

The diuision of  
Vena cava at the  
4. Vertebre of  
the loynes.

The distribution  
of Vena Cava to  
the inferiour  
partes.

from this *Os sacrum*. Whoeuer committynge his bzaunches to the Muscles of the buttockes, seruyng to the thigh.

From the same armes those beynes are purchased, whiche are implanted in the extreme end of y straight intrell. Fro this same beyne go forth those beynes, that visite the stoe of the bloodar to nourish it, and the Muscles seruyng to the straight intestine, and that in men. For in women they go to the begynnynge of the necke of the matrice, out of whiche place their mensstruous purgations flowe from them. The same bzaunch that nourisheth the bloodar cherissheth the necke of the matrice. And the same principall diuision sometime begetteth a beyne, which descendeth, and downe abroad is receiued in that hole which is plac- ed in *Os pubis* and *Coxendix*, and to the ix. and x. Muscle turnyng the thigh a- bout transposete themselves, to nourish them: yet further to the vij. and beyng strewed through the inside of the thigh, haue there an end.

Whence Menstrua  
do flowe in wo-  
men.

This neuerthelesse by the way is to be marked, that the seminarie vessels in women end not in the head of the testicles, but be poured downward to nourish the substance of the matrice. Fro these beynes the umbellicall beyne taketh his begynnynge, whereto is attributed the originall of our generation.

How the Seminarie  
vessels in wo-  
men are constru-  
ed.  
The originall of  
the Umbellicall  
beyne.

The same diuision of *Vena cava* putteth forth y. beynes, that is to say a right, and a left, which are vpwardes refleged toward the head. Their progresse is be- twene the diuision of *Peritoneum*, and aboue it, degenerating into armes and bzaunches: & vnder the straight Muscles, euen to the second interfection of them, are distributed, to carpy to the sayd Muscles and *Peritoneum* nourishment. These be the beynes, by which Hypocrites, and Galen affirme such cosent to be in wo- men betwene the matrice and bzaunches, the which sometyms may be found vnited with those y. beynes, which downwardes descendyng vnder *Sternon*, are placed in the end of the straight Muscles.

The beynes of  
Cava nourishing  
Peritoneum.

What beynes  
make cosent be-  
twene y matrice  
and pappes.

In some bodies they are ioyned onely in one part or two with a very small bzaunch. But *Columbus* sayth that in some bodies of women, what diligence so- euer be vfed, yet might be not possibly finde the vnion of these beynes. But this he sayth, that they come not from the nature, but from that diuision whence the beynes of the matrice do spring, which are not instituted to cherish the substance of the wombe, but to nourish the necke therof.

By those beynes *Adesirua* are expurged, and not passing through the matrice, as *Columbus* testifieth, in the aboue named place, where he alledgeeth the autho- rite of verry probable dissections, whiche he practised for the purpose. This thicke arme, or bolue deuised from the Stocke of *Vena cava*, when it cometh aboute *Os pubis* without Abdomen, is bzaught into the flankes, here begettynge very many bzaunches which nourish the Glandules there reposed, in which Glandules hap- pen the tumors called Bubones.

Through what  
beynes Menstrua  
are purged.

From the same place beynes appeare which walke through the yard, betwene the skinnie and fleshy Membran euen to the end of *Praputium*. This bzaunches also are through the pore of the testicles disseminated.

The glandules  
wherein Bubo  
springeth.

The beynes to  
the yard and  
pore of the  
Testicles.

Out of the same place whence we haue sayd all these beynes do spring, goeth forth a beyne most euident, which obliquely ascendeth to *Ilium*, marchyng vnder the skinnie toward the outward partes of the ribbes, and aboute Abdomen is shed out in diuers bzaunches.

This notable arme whiche a litle before we haue mentioned after it passed ou- uer the flanke, it goeth forth in thre partes, wherof one descendeth obliquely in- ward towardes the knee betwene the skinnie and fleshy Membran, and aboue it on the inside descendyng through the legge, trauielleth about the inner ankle, and vpon the foote towardes the toes, especially the great toe where it is diuersly be- stowed. This is that beyne of name called *Saphena*, out of whiche in diseases of

The beyne called  
Saphena.



the matrice bloud is wont to be loſed, in the deſſenſe whereof very many bzaunches be here and there ſent both to nourish the ſkinne, as alſo to engender fat.

The other y. thicke bowes or armes are caried covered of Muſcles, notwithſtanding that obliquely they deſcend through the inner partes of the thigh, and paſſe forth, betwene the y. lower heades of the thigh, thus caried under the ſkinne, firſt diſtributynge many bzaunches, which enuſe for the thigh, where it is bowed.

But from the greater bzaunch, which we haue ſpoken of, fiſth a veyne, which under the ſkinne firſt, then after through the hidden partes of the legge, runneth cuē to the ſote. Under the ſkinne bought of the knee in other veyne breaketh out, which nourisheth the Anterior Muſcles of the legge; and all other alſo deper, thus beyng caried downward, it cleaveth to the Ligament ſit betwene the Tibia & Fibula, which it perſozateth; clapping to the Anterior partes of the legge, and deſcendynge aboue the ſote, is with the Ligament therof coherent.

A greater bzaunch goeth ſo lowe, that it runneth euē under the ſole of the ſote by the inner ankle, ſprinklynge in the legges and ſole of the ſote diuers bzaunches, ſurcles, and twigges.

An other bzaunch likewiſe very notable is beſſed alſo through the Muſcles, and ſendeth a veyne under the y. firſt Muſcles ſit behynd in the legge, where their Tendon begynneth. Hence it riſeth up, and under the ſkinne ſloweth towarde the anterior partes, beyng finally tranſmitted to the outer ankle of the ſote. And this is that veyne of name called *Vena Scia*, *Iſchi*, or *Coxendicis*, & therefore in ſuch diſeaſes is opened. The bzaunch that is bozne under the knee is named *Vena poplitis*, which in auſtinent authorites is often mentioned. From which veynes, as alſo fro others afore deſcribed, very many ſurcles and twigges ariſe, which beyng ſmall, and diſperſed hether and thether diuerſly, with vncertaine order, and unlike at all tymes, for auoydynge vniſproſitable proſtitie, my author all further endeavour willynge omitteth, and I, not deſirous to offend in ſo much diligence, do here vndaine the ſote of this matter, leſt it be ſayd vnto me as *Antalcida* answered the proſent of the Perſians, whoſe kynge ſeekynge him a garland of roſes, touched ouer bedes with ſome odiſerous oymēt, I receiue quoth he the gift & I prayſe the promptitude of his mynde, but he hath loſt the ſauour of the roſes, and ſtrangitie of their nature, by deſpauynge and falſifying their Arte.

This therefore ſhalbe ſufficient to the ingenious reader, ſaying well, the firſt creation of the veynes to be for the traſpoſſynge & conuayynge of bloud, the liuely nourishment, to all partes of the body, ſo ſo ſayth *Columbus* all members are onely nourished by bloud. Wherefore nature deuised the veynes hollow, to the end that like riuer they ſhould runne throughtout the body, hauynge coates made thynne, yet of ſinewy ſubſtance; and made (as *Galen* affirmeth) of Membranes, and Fibres, toughed therfore, and able, not in prompt to euery ruption.

*Leonardus Fiſch*, de *humani corporis fabrica* comprehendeth all the veynes of the body within the number of iiii. as the rootes of all the reſt. That is, one proceeding from the hollow ſeat of the liuer, and runneth into the veſſicle of choler, into the ventricle, into the ſpleine, *Meſenterium*, and *Omentum*.

The ſecond of the Gibbus part of the liuer, into y. reſt of the body (the lunges onely excepted) and is diſperſed with an innumerable part of bzaunches.

The thyrd from the right ventricle of the hart is ſpread into the lunges, onely that veyne maketh this peculiar chalenge, becauſe it conſiſteth of the body of Arteries to be called *Arterialis*.

The fourth is produced from the Pauell into the liuer, and onely ſerueth to the nourishment of the infant. From theſe all other veynes, that wander by and downe in mans body are mutually deriued, and take their begynnynge. And this is the end of Veynes.

The bleedar, that is the receptacle of yelloſ choler, and called of ſome *Cistis Fellis*, of others (though more rabely) the Gall or purſe of citrin choler, hath his ſeate in the hollow ſide of the liuer. For on what ſide the liuer amplecteth the right ſide of the ventricle, there is a cauitie engrauen exquisitely agreeynge to the middle poſſion of the gall. And to that cauitie the middle ſuperiour poſſion of the ſame veſſicle after the length therof groweth; but the inferior part of it, with out the ſubſtance of the liuer hangeth downward.

It is in foure long and round, by litle and litle downe to the point of the bottoome therof like a certaine lōg faſhioned peare enlargynge, ſo that with a narrow mouth, & more ample bottom it conſiſteth. For it being required that the reſt of the body therof, ſhould be large & capable, becauſe it could not be made exactly round as a globe, the cauitie is after the lōgitude therof augmented: therfore nether affected with any incommoditie by the ſtomach, nor overmuch inſinuated in the liuer.

But that being emptied it might ſat of ſpzinke in, like as by ſilling extend, it is conſtitute of Membranous and ſinewy ſubſtance, conſiſtynge of one ſimple and peculiar coate, thynne, but hard and firme enterwoven with thye ſold manner of Fibres. The ſtraight be inmoſt, the next are the oblique but ſelwer then the ſtraight, the outmoſt are the orbicular or tranſuerſe Fibres. To this tunicle of the gall is lent an other from the coate of the liuer, not to the whole veſſicle, but to that part onely that hangeth without the body of the liuer, whiche alone needeth it for an inuolucere and propugnacle.

This veſſicle although it growe in dade to the liuer the ſhoppe of ſanguification, notwithstanding it taketh vnto it y. very ſmall veynes from the ſtocke of *Vena porta*, in that order diſſuſed into his coate, as we ſee the litle veynes ſcattered into the adherent or white tunicle of the eye. Alſo from the Arterie reached out to the hollow of the liuer, a very ſmal bzaunch is offered out to the ſame, wandrynge euē to the very extreme part of the bottoome therof.

Neither is the ſame deſtitute of ſinewy relief, leſt likewiſe of ſenſe it ſhould be frustrate. For the ſperue of the liuer beyng lead by the lower Membran of *Omentum*, and brought from the right ſide or ſtocke of the y. payre of ſinewes of the bzaune, reached out to the rootes of the ribbes, deliuereth forth a ſurcle to this veſſicle, in leane bodies almoſt no leſſe euident then the Arterie.

The wayes of this veſſicle made to receiue and put forth are thus. The necke of the veſſicle (ſomewhat harder then the bottoome) endeth by litle and litle at a ſtrate pozie paſſage, at that part of the liuer, whence *Vena porta* taketh his begynnynge. Whether when it is come, it deuident into two Proceſſes, one reachynge vppward, the other downward. That which is caried vppward lyng to the Anterior ſide of *Vena porta*, aſcendeth into the liuer, and therein beyng in two partes diſſected reacheth one to the right ſide, the other to the left. Query of theſe alſo in the liuer are digeſſed into other ſurcles, and thoſe agayne into others, vntill they haue conſtituted an innumerable order of bzaunches, through the body of the liuer betwene the armes of *Vena porta* and *Cana* diſſuſed. And theſe are the ſurcles or bzaunches, by whoſe labour choler is drayne into this veſſicle.

But the Proceſſe of that way of the veſſicle which reacheth downward, under ſet with the inferior Membran of *Omentum*, haſteneth downe ſomewhat obliquely, and is implanted to *Duodenum* not farre from the begynnynge of *Jejunum*, nay to the begynnynge of *Jejunum* ſayth *Columbus*. This Proceſſe (whereof beſore is made mention) carieth choler expulſed from the veſſicle into the intrels, in the meane tyme neither admittynge any of their iuyce or windynge, nor any of the choler to regurgitate backe agayne, becauſe they haue into the intrell not onely a withſtynge entraunce, but it is brought to paſſe by the benefite of two Membranes, ſlackly ſet to the ſides of the Orifice, lightly yeldynge way to the waight of choler

The bleedar of choler.  
Col. Lib. 1. cap. 2.  
Situation  
Vefal. Lib. 5. cap. 8.

Figure.

Subſtance.

Fibres.

Tunicle.

Veynes.

Arteries.

Nerves.

The paſſages or wayes of y. bleedar of choler.

The bzaunches whereby choler is drayne into this Veſſicle.  
The paſſage of coles inſerted to *Duodenum* after *Vefalio*, to *Jejunum* after *Columbus*.  
Loc. Cit.  
The uſe of the paſſage to the intrels.  
The induſtry of nature in the paſſage to y. intrels.  
The uſe of the Membranes ſet to the orifice of this paſſage to the intrels.

Vena ſci, Iſchi, or Coxendicis.

Vena Poplitis.

Adrian, Lib. 14. de Var. Juſt.  
Antalcida his anſwer to the Perſians preſent.

Col. Ibidem.  
Fuch. Lib. 1. cap. 14.  
The brittle of veynes.  
All partes are nourished with bloud onely.  
Why veynes were made hollowe.  
The ſubſtance of the veynes.  
Gal. Cap. 2. Lib. de iniqua. intemp.  
Fuch. Lo. predicto.  
How all veynes are comprehended in the number of iiii.

1.

2.

3.

4.



rushing in, as also wholly inhibiting the returne therof into the passage againe.

But the same passage inserted to the gutte is for the most part stopp'd one, and in very few two, or deuided. Wherefore there is ouer playne proofe that *Razis*, *Mirdinus*, *Valescus*, & *Carpus*, with others of that Arabia sect, were exceedingly deceived, who affirmed that nature continually had assigned y. wayes, for the vomiting forth of choler from his vessell: as one to the intrels, an other to the ventricule. For if choler should so haue recourse vnto the ventricule, the same should by the biting therof (as *Gal. 5. 25. parium* affirmeth) perpetually prouoke or rather compell the ventricule to abhorre the meate: nether should it so much vse the rectentue facultie, as whilst the meat were concocted.

*Vesalius* confesseth he neuer saw it in all his tyme but in one onely man, who in diuers other organs, and specially about the ribbes and Muscles of the breast, as he varied from the woorkemanship of other bodies, so had he one passage also of choler that visited the ventricule, being a man of state, and temperature of body, hoate and dry.

*Realdus Collumbus* neuer found it, although he persecuted him very often & diligently to haue searched for the same. But he denieth not whē there is great abundance of the same yellow choler, that it accusometh to regurgitate, & belche vp to the Ventricle, albeit the same is agaynst nature, & not accordyng to Nature.

Contrariwise nothing resisteth the incourse therof into the intrels, since there the gift therof is notable, cutting, purging, and whipping away all grosse flegme, or vnpassable humours heaped in those small passages. Furthermore by stopping and biting, prouoketh their propriety to a small extrusion of the excrementes. And it selfe also together with the excrementes, yeldyng no hurt (when as in man all thynges are dispensed by the law of nature) but great good purpose, is at length put forth from the body. Of very right therfore the passage carieng choler is in the guttes, not in the ventricule, implanted.

Choler is, as all sufficiently know, the thinnest excrement of blood: like as melancholic is the thicke dregges of the same.

The splene consisteth on the left side of the ventricule, more after the inferior and posterioir partes. It cleaueth to the left part of *Septum transversum*, almost in the middelt betwixt the left side of the bodies of the Vertebres, and the Cartilages of the false ribbes.

In foure it is correspondant to the proportion of his seate, and like vnto the liuer impressed in him selfe by the partes adiacent. For where it toucheth the midriff, as the same is their somewhat hollow, so accordyngly the splene in that place is bunched or Gibbous. Where the ventricule after a certaine sort lyeth on the splene, as it is large, and there like a great globe extuberat, so in like case the splene a litle, and in the vpper part onely is hollow. For in swine, Dogges, and Dren, whilst it is longer but narrower, and stretched in longer space to the Gibbous part of the Ventricle, it is in them more hollow, and more complecteth the Ventricle in manner of the fourth part of a circle.

Contrariwise in man the splene is thicke, great, and broad, though shorter then in such kynde of creatures, and yet for all that not exactly foure square. The length farre exceedeth the breadth, for y. lower part of it stretched forth more to the anterior partes of the body, endeth at a blit corner: but y. vpper part, into a more obtuse corner is compessed. The left side is somewhat gibbous, y. right easely hollowed with it. light impressiōs. The hollow of the splene, with a more profound lyne reached after the length therof, aboundeth, which directly proceedeth, & vnequally here and there swelling forth, admitteth the sinuated vessells of the splene.

This bowell moreouer in man is naturally endued with a certaine blacke & very obscure colour, but in a dogge hath for the most part a more splendent red then

then the liuer in swine whitish.

The substance of the splene consisteth of thicke and much blacke concreted blood, like the more solid kynde of sponge, and lighter pumise stone, packed together with the frequented Fibres and filaments of vessells. It is therfore rare, and slacke like a spoge, to draw and receiue the thicke iuyces from the liuer. And for that cause the small twiggies or Fibres of the vessells (destitute of hollownes) euery where wouen together, are couered with much thicke and feculent blood, which *Erasistratus* called *Parenchima*, because it is poured forth about the vessells like as in the liuer.

Veynes, Arteries, & Perues vnto the splene are after this sort. The lesser or the least trunk of *Vena Porta*, supported by the inferior *Omentum* of *Omentum*, tendeth ouerthwartly to the splene, and first offring bzaunches to the posterioir seate of the Ventricle, and the vpper Office therof, and to the lower *Omentum* of *Omentum*, as also to *Colon* where it cometh to the Ventricle, when it hath put forth these, the rest of it deuied first into two bzaunches, and those afterward into others, so that at length in copious order of bzaunchynges, through the lower *Omentum* of *Omentum*, they might be to middle part of the hollow of the splene, after the reditude of the straight lyne lately spoken of, implanted. But before these bzaunches lose themselves in the substance of the splene, from one of the more notable bzaunches, feling into the lower partes of this bowell, a veyne breaketh out, marchyng thence to embrace the lower seate of the Ventricle. For the other bzaunches goyng to the splene, sometyme three, sometyme more bzaunches spring, runnyng to the left side of the Ventricle, but not to the vpper Office therof ascendyng. And euē as the veynes that come vnto the splene are supported by the inferior *Omentum* of *Omentum*, so likewise those bzaunches, that from them are deriued to the Ventricle, by the superioir *Omentum* of *Omentum* are sustained.

Arteries also, whiche with such frequented course are directed to the splene, fetch their begynnyng from the Arterie, which buzzing forth the great Arterie about the region of the reynes, groweth into the inferior *Omentum* of *Omentum*, and on the left side is especially offered to the splene in equall order with the reynes thereto appertainyng.

Perues to it are begotten from the bzaich of the v. payze of the bzaime, which ministrerth to the rotes of the left ribbes, and sendeth a furcle to the lower *Omentum* of *Omentum*, to be sprinkled in the coate of the splene, rather then in the substance therof. Moreouer the splene no lesse then the liuer, is couered with a certaine thinn and simple coate from the *Omentum* of *Omentum*, that are tyed to the straight lyne of the splene. For these *Omentum* of *Omentum*, being inserted to the hollow of the splene, do degenerate into his coate. And because they haue their originall from *Peritonaeum*, by their benefite, and interuenture, we may woorthely say that *Peritonaeum* it selfe offreth a coate to the splene.

But beside the knittyn of this bowell to the backe, and to the Ventricle by the assistance of *Omentum*, small twistes or Fibres, commyng from *Peritonaeum* where it clotheth the midriff, are in vncertaine number knit to the bunched part of the splene, whereby it cometh to passe that the splene is also bound vnto the midriff. But *Vesalius* confesseth that these are not alway to be found in man. So sometyme it falleth out that the Gibbous part of the splene is firmified to the exterior inuolue of the left kidney (which sloweth with fatnes) by the mediatio of certain Fibres. But especially if the kidney (as oft it hapneth) be strewed for the most part vnder the splene.

And this is the true description of y. splene, ordained of nature to be the receptacle of the grosse & feculent part of blood conected in the liuer. For as the best

Na. i.

sicle

Substances.

The vse of the splene his substance.

Why the substance of the splene is called parenchima.

Veynes.

The begynning of the veynes from the splene to the Ventricle.

Arteries.

Ministrerth to the splene.

The coate of the splene.

How the splene is bound to the midriff.

Cap. 9.

How the splene is sometime tyed to the inuolue of the kidney.

The office of the splene.

The error of sundry Arabians.

What incommoditie might happe by choler commyng to the ventricule.

What Vesalius once sawe as touching the commyng of choler to the Ventricle.

It is agaynst nature when choler belcheth vp to the ventricule.

The vse of choler to the intrels.

What is choler.

The formation of the splene.

Figure.

Magnitude.

Where y. vessells are situated.

Choler of the splene.

By what the  
splene draweth  
his feculent  
blood.

The operation of  
the splene.

The vse of the  
arteries in the  
splene.

The vse of melanc-  
oly enomitted to  
the ventricle.

Vesale Capax.  
The kidneys y.  
in number.

The reason of  
their situation.

How the seat for  
the kidneys is so  
litle prepared.

Libert. Cap. 9.  
Caues in wayne  
disputed of the si-  
tuation of the  
reynes.  
In beastes the  
right reyne lies  
mounteth the  
lefte, but in man  
contrariwise.

The contrary  
opinions of Ves-  
alus & Columbus  
as touching the  
situation of the  
kidneys.

The author has  
indignet between  
both.

The reason why  
the kidneys must  
be situated higher  
then the other.

sicle of choler serueth to sucke away the thinne & lighter fecrment, so the splene to receiue the thicke and melancolie humoꝝ. And this the splene allureth, and draweth vnto him by the trunkes of *Vena porta* commyng vnto him (as is sayd) in sundry bzaunches.

But this same tyme beyng drawne, it doth not immediately put forth, but first with great diligence both labour and confect the same, making it lose & spongiuous, apt for his own nourishment, to which thyng are chiefly assistat the oft inserted Arteries in the splene, by their heat highly helping to the exact elaboratio of his blood.ouerthelesse if any part flee from the same elaboration, beyng vnapt for his nourishment, or to be made equall to his substance, it is enomitted in to the Ventricle to a great purpose and vse, as before in the Ventricle is shewed, *Euchsius* flatly affirming that by his sowzenes he assisteth the holdyng and contractiue functions of the Ventricle: although *Vesalius* in his description of the splene (seyng the sundry opinions of men) durst affirme nothyng. But *Columbus* doth iterate old *Aricens* his opinion, notwithstanding *Vesalius* doubtles, and *Euchsius* affirmation.

**T**he reynes, which strayne the blood sent of the liuer into the hollow beyne together with serous and watrish humiditie, which in plenty surmounteth both choler and the feculent blood, are made of nature two in number.

And that moze speedely the serous humoꝝ, which we call vyne, might by them be separated fro the blood, they were both placed so neare vnto the liuer as was possible. For the right kidney in this vpper part toucheth the lower region of the liuer, and the left seateth him selfe so hye, that on some side it lyeth vnder the splene. Other of them lyeth neare the sides of the bodies of the Vertebres, in the lower regio of the midleif, where the same couereth the x.ri. and xij. ribbes, especially in that part where the ribbes are most of all to the posterioir partes oblique and crooked. For that bowyng of the ribbes to the posterioir partes offreth to the reynes a fit seate, whereby they are both safely fenced, as also notably presented, lest they being towardes the anterior partes, yea but a litle, prominent, should occupy the seate of the other organs of nutrition.

Galen (sayth *Columbus*) vsed much wayne labour, in searchyng out the cause why nature left the right kidney higher then the other, as though the right were situated higher the left, but his study and reasons therein are fallen together: vnllesse (sayth hee) yet discea beastes: for then you shall finde him not to haue written rashly: in them the right kidney surmounteth the left, but in man contrary altogether.

Now I know not playnly where to impute the fault, but betwixt ij. so famous Anathomistes, I meane, *Vesalius* and *Columbus*, (the one writing that where the splene descendeth lower then the liuer, there the right reyne for the most part to be higher then the left, and contrariwise, the other affirming that in man the right is alway lower then the left without any exception) the ignorant Reader, and such perhaps as neuer saw dissection, should rather seme snared in a heape of doubtles, then to passe this point with a cleare resolved mynde. And *Columbus* I maruell that in all his tyme he had not sene it, els sene, hath not written it. But sure he that diligently shall goethrough his whole worke, shall clearely see that he hath not shot at any thyng with light coniecture, neither set down, which he had not particularly obserued in the body of man: and to him of necessitie (because in my tyme I neuer sawe the right kidney higher then the left) I am constrained to subscribe.

But that the situation of the reynes must needs be one contrary to an other *Vesalius* very elegantly hath remembred. The greatest occasion (sayth he) not beyng taken of the place wherein they might aptly be seated, but because in opposite or-  
der

der they might not draw the serous blood: for so the one fetchyng it directly to the contrary side, should haue wholly prohibited the office of the other.

In fourme the kidneys are long, but lesse broad, and euery where equally thicke. Before and behynd they are compressed, and on the out side exactly oblicular or round compassed, and Gibbous: but in the inside, which is thoster then the outside, partly hollow. For in the middle regio of the interior side they haue a hollow deeply impressed, which in the higher and lower part of it maketh a sharpe corner, but in the middelt betwene both an extuberant part. In the vpper side the reynes be a litle broader then in the neither, as also the exterior side is somewhat thicker then the interior. *Columbus* compareth the kidney to the figure of a litle pulse or grape, called of the Herbarians *Faseoli*.

The reynes are endewed with that magnitude or greatnes as might suffice to take away the serous humoꝝ vnpossibable to the blood. Their outer face or shew as it is smooth, and slippery, so also very red and shining. It is of substance fleshy, thicke, very solid, and hard, and litle varyeng from the substance of the hart, saue that it is enterbouen with no Fibres at all. For the substance of the reynes, as also of the liuer and lunges, is destitute of Fibres, onely the Fibres of the vessels poured out into him, seruyng to attraction, retention, and expulsion.

But whe as the whay of blood ought by the reynes to be strayned out, because they might not so sicly grow to the bodies of the hollow beyne and great Arterie, as the liuer it selfe vnto the hollow beyne, therfore notable bzaunches are brought from the beyne and Arterie vnto them. And from the hollow beyne two great armes are reached, that is to say, each of them to ether of the reynes, which becalie not out one directly agaynst an other, but alway the one higher then the other according to the situation of the reynes, and these are commonly called the Emulgent beynes. The like reason is of the Arteries, which beyng reached out vnder the beynes, are together with the caried ouerthwartly into the vosome or hollow of the reynes, which is fourmed in the inside of them, as lately was declared.

Immediately, and so sone as the beyne and arterie haue come vnto the sayd vosome of the kidney, they are first either of them deuided into ij. bzaunches, before they make any entrance at all, one bzaunch offering it selfe to the vpper corner of the same hollow, and the other to the neither. And in the same progresse of the vessels into the reines, the arteries very seldome scatter from them selues any bzaunches, but are wholly spent in the substance of the reynes. Yet from the beyne of the left kidney, the Seminall beyne seekyng downe to the left testicle, is sent. And sometyme like the right beyne, springeth a bzaunche abroad in the fat Membranous coate of the kidney, which *Vesalius* sayth is to be found, when the left reyne occupieth the higher seate, and that is either alway or most commonly.

Now we will unfold the way of the vessels, and their distribution throughtout the body of the reynes, as also the celses, or cauities in the kidney.

**T**here are therfore in the reynes two cauities, but farre otherwise framed of nature then sondry Philosophers haue supposed. For the beyne & arterie goyng into the body of the kidney do degenerate into one, aunswerable in hardness and thicknes to the coates of the Arteries. And this beyng hollow after the maner of a beyne or arterie throughtout the body of the kidney distributed. For, first by litle and litle beyng dilated, it is separated after a certaine sort into ij. partes: of which we will call the one the anterior and the other the posterioir. The anterior after one order and course produceth now fire, now seuen, and sometyme also moe bzaunches of equall thicknes, in which this anterior part of the Membranous body or first cauitie is finished. These present bzaunches after the anterior part of the kidney, one equally (according to the fourme therof) departyng from an other, do hasten towardes the outside of the same, yet not to the outer face of the  
sa. y. same

The figure of the  
kidneys.

Magnitude.

The substance of  
reynes.

The vse of the  
fibres of their  
vessels.

Reynes offered to  
the kidneys.

Which are the  
Emulgent beynes,  
Arteries to the  
kidneys.

Whence begin-  
neth the Seminall  
beyne.

Two cauities in  
the kidney.

The description of  
the distributiō of  
the beyne and Ar-  
terie throughtout the  
body of the kidney.

where the bleed-  
er is harder, and  
thicker.

Fibres.

The action of the  
bleddar.

why the coats of  
the bleedar is  
hard and thicke.

The second coate  
of the bleedar.

Veines and Ar-  
teries to the bleed-  
dar.

Arteries to the  
bleddar.

The brittle of the  
sense to the bleed-  
dar.

Col. Lib. cap. 10.  
The way chiding  
Urine from the  
infant as yet in  
the wombe.

Vesal. Lib. 1.  
The vse of the  
arteries to the  
sides of the bleed-  
dar.  
The insertion of  
the vessels bring-  
ing Urine into  
the bleedar.

The coats of the  
bleddar being  
vaine.

hauping this peculiar gift vnto it selfe, that in the highest part of the bottom ther-  
of, and where it goeth into a necke, for the implantation and explantation of cer-  
taine passages, it is made harder and thicker.

So coate in all the body (sayth Vesalius) more exactly sheweth the iii. kinde  
of Fibres then both the bleedar being blowne vp. For the straight are the inmost,  
the transuerse the outmost, and oblique the middlemost: through which the bleed-  
dar purchaseth expulsion, retention, and attraction. Hard and thicke ought to be  
the coats of the bleedar, because of necessitie it must reach forth to so great a  
quantitie, as also be subiect to vlcérations, stones, sharpnes of Urine, and such  
kinde of euils: which vnlesse it were hard, would easely teare, eate through, and  
perforate the same.

It hath an other thicke and strong inuolucere given from *Peritonæum*: and this  
is called the second coate of the bleedar. This *Peritonæum* offeth vnto it, where  
aboue *Os pubis* the bottome of the bleedar and all the Anterior region thereof  
cleaueth thereunto. But the posterior side of the bleedar, respectyng the straight  
gutte, is smooth, and slippery, annoynted with a watrish humoz.

But lieth the Urine in the bleedar is vnapt for nutrition, nature right  
well distributed thereunto beynes, and Arteries, wherewith his heate might be  
maintained. And first the hath deriued on both sides of the necke of the bleedar  
one veyne, and one Arterie, from the braunches of *Cava vena*, and *magna Ar-  
teria*, through the hole in *Os pubis* goyng downe to the legge, which, thence as-  
cendyng after the length of the body of the bleedar, are waisted into a sort of small  
twistes and bearelike furlles.

Of Perues nether is the bleedar destitute. For albeit that Urine, with a cer-  
taine familiar substaunce, no lesse then choler into his proper vessel, willingly  
floweth, nether whilst it is naturall is any thyng at all iniured thereby: some-  
tyme notwithstanding so much cholerike excrement is mixed therewith, where-  
by it becommeth so sharpe and biting, that vnlesse the bleedar by sense could  
iudge the qualitie of Urine, in retainyng the same long it should be grievously  
affected. Therefore amongst the other partes of the body the bleedar obtaineth  
not the least Perues, onely for the sense of touchyng, reached from the braunches  
of the vi. payze, lent out to the rates of ribbes, as also from the lower payzes pro-  
duced from the spinall mareyn.

Beside these vessels and Perues, out of the higher part and middest of the  
bottome of the bleedar a way springeth (that is to say, infantes whilst they yet  
are in the mothers wombe) called *Urachos*, which goyng forth at the nauell and  
through the innermost inuolucere, is the passage whereby the Urine is conuayed  
from the child, whiche after it is brought forth to light, serueth no more to any  
vse, but being bound to the nauell susteineth the bleedar.

So also to the sides of the bleedar y. Arteries are attendaunt transpoyntyng to  
the infant vitall bzeth, which afterward, no lesse then the sayd way of Urine, dry  
vp and become vnprofitable.

Moreover into the lower seate of the bleedar, beside the beynes, Perues, and  
arteries, into the hollow therof two others passages are inserted deducyng Urine  
from the reynes, & called *Vreteres*. Nether were they rashly deuised of nature.  
For when the reynes (as most behouefull) must be placed neare vnto the liuer,  
but contrariwise the bleedar in a lower region: it was necessary that certaine  
passages were made whereby to conuay the vyne out of the reynes into the bleed-  
dar, & those nature effourmed very like vnto the body of reynes. For they consist  
of one simple coate, a litle harder then the coats of the beynes, and enterwoven  
with seluer oblique Fibres. For to they are made more apt to beare out iniuries,  
and both easie to stretch out, as also to yeld agayne, and the oblique Fibres do no  
thyng

thyng hinder, whereby the Urine should not swiftly passe into the bleedar. These  
are explanted from the second cauitie or cell in the kidneys, leadyng the through  
the middest of the first cauitie: hence being extended to *Peritonæum*, aboue  
the Muscles of the loynes, securely crape downeward to the bleedar. In their  
progresse they growe to *Peritonæum*, and by gettyng from hym certaine Fi-  
bres, take on them an other coate, enterwoven with litle beynes and Arteries  
as is *Peritonæum*.

These by the way are very litle, anfractuons, or turned. For out of the caui-  
tie of the kidneys they are downeward a litle towardes the inner paytes deduc-  
ed, the better to come vnto the bleedar. But lest they should hang, and not  
firmly be inserted to the bleedar, or should make ouer crooked a way to it, they  
are not implanted to the highest part thereof, out of whiche proceedeth the way  
for the Urine of the infant to the nauell, as before is said; but that side of the bleed-  
dar, which is nearer to the posterior region of *Peritonæum*, to the which these  
vessels in all their progresse securely grow.

But the region, where first on each side these pores take hold, is in the posterior  
part of the bleedar a litle before the necke, and penetratng the coats of the bleed-  
dar that spring from *Peritonæum*, with an oblique anfract or turne, at length  
pearcing the other coats, do open and enter into the hollow of the bleedar, in like  
order as the passage of choler is inserted to *Leiumum*: that is to say, with lose or  
slacke Membrans on both sides, set to the hole of the passages or pores, from the  
body of the bleedar appendant, like as if to the inner coats of the bleedar such  
thinne Processes there should growe. The vse of these, is answerable to the of-  
fice of the Membranous Processes growyng to the way that leadeth choler: that  
is to say, they giue place vnto the Urine flowyng out of the pores into the bleed-  
dar, and whilst the bleedar being distended, is willing to regurgitate the same  
into the wayes agayne, these gathered together, and stuffing the pores, wholly  
inhibite the returne of the Urine. Whiche worke so effectually they byyng to  
passe, as that by them no ayre at all may issue out, notwithstanding that the  
bleddar be filled with wynde, as Galen abundantly teacheth *Lib. 5. de vsu partiu.*  
And that the same oblique goyng in of the insertion of the pores serueth to the  
same vse, the blowyng vp of the bleedar exquisitely sheweth.

The same experience we daily see in bellows, for by the hole which is on the  
backe side ayre is drawne, but when the bellow is compressed, the flappe by force  
of the wynde being pressed to the hole, none at all may returne. The insertion  
therefore of the Urinarie passages consisteth at the inferiour and posterior re-  
gion of the bleedar, not farre from the necke thereof. But here is to be remem-  
bered by the way, that certaine heretofore, being ignorant altogether of these  
described Membrans, haue neuertheless had the boldnes to affirme that Urine  
was gathered into the bleedar by resubation, or sweatyng through, who here, as  
in a glasse, may see the futilitie of their subtilie inuention.

Here the lowest part of the bleedar endeth at a narrow issue, whiche we call  
the necke of the bleedar, otherwise in men then in women put forth, as also in  
those fastened and growyng to other partes then in these, and to conclude shew-  
yng a diuerse vse in both. First this is common to both, that is, a Muscle lapped  
round about the necke of the bleedar, which taketh charge that the Urine flow  
not forth agaynst our will, as abundantly in the Hypstoy of Muscles we haue  
sayd. So likewise both in men and women the Urine goeth forth by that way,  
but in men it also serueth to the elaculation of sperme. Therefore to the necke of  
the bleedar are giuen two Glandules called *Parafate*, or *Assidentes*, which re-  
ceiue the vessels bringyng sebe, and agayne by great desire in coiture put forth  
the same by the passage to the extreme end of *Penis*: of which it is at length elac-  
ulated.

Fibres.

Whence the  
many vessels haue  
the second coate.

Why the vinary  
vessels are not  
implanted to the  
bottome of the  
bleddar.

Leiumum (sayeth  
Collumbus) but  
Vesalius sayeth  
Duodenum.

The vse of the  
Membrans to  
the insertion of  
the vinary vessels.

The membrans  
in the vinary  
vessels compa-  
red to the deuise  
in bellows.

Col. Loc. Cit.  
The error of  
certayne.

The necke of the  
bleddar.  
What in the bleed-  
dar is common  
both to men and  
women.  
The vse of the  
Muscle in the  
necke of the bleed-  
dar.  
The Glandules  
called Parafate to  
the bleedar in  
man.  
Col. Loc. Cit.

## The fift Booke of the History of Man.

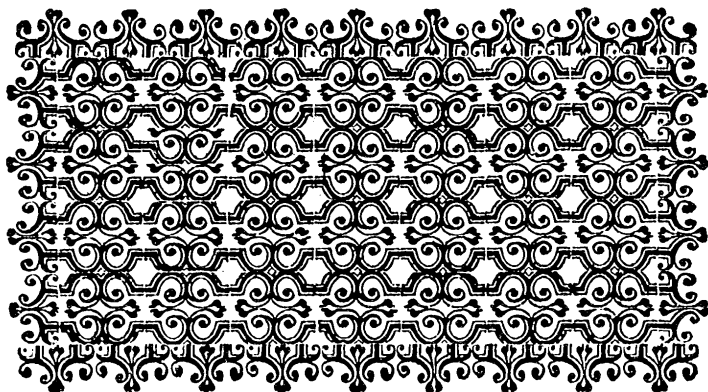
How the ſeede  
goeth forth from  
thoſe glandules  
called *parastata*.

The office of the  
bledbar.

The bledbar co-  
pared to a foun-  
taine.  
The bledbar in  
women wanteth  
the glandules  
called *parastata*.

culated. For this way of paſſage is common both to Urine and ſeede. How the ſeede from thoſe Glandulous bodies goeth out, is not playne to euey one: for ne- ther is there any open or manifeſt hole thereto, but very many litle porie places like as pertaineth to a ſponge: they neuertheleſſe at the firſt ſight not very con- ſpicuous, albeit that by preſſing the Glandules they immediately appeare: for then the ſeede that lurked within appeareth. The vtilitie of the bledbar (left I delay the tyme with ouer many wordes) is firſt to receiue the Urine brought vnto it from the reynes by the Urinarie veſſels called Vre- ceres, then a while to deteyne the ſame, and laſt of all to a- uoyde it. So maruell therfore if to a fountaine it be compared. In women it cleaueth to the matrice, wantyng the Glandules called *Parastata*.

*An end of the Historie of Natu-  
rall and nutritine partes.*



## Of the History of Man, the vj. Booke of the instrumentes ſeruyng to the propaga- tion of mankynd. That is to ſay,

*The generatine partes.*



When Nature, through occasion of the matter, was de- nyed the immortallitie of man, as *Gal. Lib. 1. de mend. ſant. Cap. 1.* plenteouſly teacheth, notwithstanding, to the conſecration of humane kynde, euen from the be- ginning, the almighty creator made h. men: the Male, to reach out the effectuall begynnynge of generation: the Female, aptly to conceiue the ſame, and to nou- riſh the infant begotten of that matter. To the which giſtes, both the man, and the woman obtaine ſit, and peculiar instrumentes. What they be, and how they ſerue, ſo farre as from the begynnynge my purpoſe hath intended, that is to ſay, almuſch as of the Male may commodiouſly be ſpoke (for moze I thought not good to tranſlate into Engliſh) ſhall now ſpecially be declared.

The Teſticles therfore, which firſt we will open, are ſituated ſo, as is euident to ech mans ſight. They are two in number, round, but there withall ſomewhat long: a litle blunter, and larger below, then in the ſuperiour part, although ve- ry obſcure to be iudged. On the outſide of the teſticles is no maner of cauitie, in- preſſion, or inequality. They conſiſt of white, milkie, and ſoft ſubſtance, euey where alike, and continuall: ſaue that it is filled with very many, and moſt ſmall beynes, whereby it ſeemeth light, and hollow, as is the ſubſtance of the ſplene. But they are hollow, as alſo Galen witneſſeth *Lib. 14. de vſ. part. cap. 10.* that the matter, taken in the veſſels to be cocoted, they after receiuyng, might labour it agayne, to make it moze perfect, hoater, and ſit for generation.

The Teſticles are covered with many coates: ſome common to both, and o- thers peculiarly entwapping either of them.

As touchyng which coates, or inuolucres (whether I terme them it ſozceſh not) great ſtrife, and controuerſie, I may not ſay conſuſion, is found amongſt the Anathomiſtes, chauncing either through want of ſkill, or els negligence, or both. Neuertheleſſe, I haue determined to ſet downe the opinions of the beſt, and, as playnly as I can, wherein they diſagree, ſuſpendyng myne owne iudgement, for obſcuryng the light to the Reader. Wherefore, in hauyng befoze your eyes, to diſſect *Scrotum*, for the ſight, and adminiſtration of the Teſticles, firſt appeareth *Cuticula*, the *Cutis*, which, in this place, is moſt thynne, and wrinkled, next *Mem- brana carnea*, betwene which, and *Cutis*, is not fat, leſt it ſhould not extend, and contract, reach forth, and wrinkle together, as it now doth.

Proper Membrans to the Teſticles are numbred two, whiche particularly entwap either of them, in largenes, making, and thynnes, one varyng from an other. For the exterior, or outmoſt clotheth the Teſticle, and his veſſels, euen vnto that part, where they are committed to the large ſcope of *Peritoneum*, beyng ſtrong, thynne, and aboundyng with beynes. For where the ſeminall beyne, and arterie, as alſo the veſſell carryng ſeede bpward, are brought forth of the great ſcope, or amplitude of *Peritoneum*, into the regiſ of the ſanke, and into the purſe or codde, thence *Peritoneum* induceth this preſent inuolucure, which woorthely is to be called a part, or Proceſſe of *Peritoneum*: for ſo it is produced from *Perito- neum*, as the codde from the ſkinne. This coate, on the outſide, where *Membrana carnea* toucheth it, is thereto growne, by certaine Membranous Fibres.

*W. i.*

*Apore*

*Veſal. Lib. 5. cap. 12*

The cauſe of the  
creation of both  
humours.

The generatine  
partes of the Fe-  
male are omitted

The Teſticles.  
Number.  
Figure.

Subſtance.

Galen,  
106.

The coates of the  
teſticles.

*Col. Lib. 11. cap. 14.*

*Col. Loc. cit.*  
*Cuticula,*  
*Cutis.*

*Membrana carnea,*  
In the purſe of  
the teſticles is no  
fatte betwene Cu-  
tis, and Membra-  
na carnea, and  
why.  
*Veſal. Loc. Cit.*  
The proper  
Membrans of  
the teſticles.

The deſcription  
of the outer coate.  
Whence the firſt  
coat of the teſti-  
cles ſpringeth.  
The outſide of  
the firſt coat how  
it is.

For coner on what side the coate of the right testicle toucheth the coate of the left, by Fibres likewise both the coates are committed mutually together: so that y<sup>e</sup> outside seemeth not very smooth, but rough, by meanes of y<sup>e</sup> Fibrous growyng together of y<sup>e</sup> Membranes. But the inside, or interiour part of this coate, where it respecteth the Testicle, & his vessels, is smooth, & with a watrish humoz annoynted.

Furthermore this coate obtaineth something common with the fleshy Membranes of the body. For as that, in some part, is increased, and enterwoven with certaine fleshy Fibres, and thereby degenerateth into the nature of a Muscle, even so this coate of the Testicle, after the whole length thereof, in the posteriour part, obtaineth from *Peritoneum*, downe to the lowest part of the Testicle, fleshy Fibres, and theweth the nature of a certaine strict, and long Muscle, which to the same coate, or Membrane is fastened: no where departing from it, but beginning with it from *Peritoneum*, is also, together with the coate, growne to the inferiour part of the vessell, that carrieth seede from the Testicle.

This coate, besides that it fitly couereth the Testicle, and holdeth it suspended, by the benefite of that Muscle, draweth upward the Testicle, as with a certaine voluntarie mowynge. By occasion of this Muscle, that is to say, because it is red, as the rest of the flesh, that coate is called *Erythroides*.

The second, is under this, and nearer to the Testicle, by the meanes, and intermenture wherof, the vessels, to be committed to the Testicle, do grow there to. For there this coate is flacker, thinner, and softer, where y<sup>e</sup> vessels are fastened to it, then the whole compasse els. For to the higher part of this coate, a veyne, and arterie, bringyng bloud and spirite to the Testicle, do growe: and there also many braunches, perfozatyng this same coate, do make incurse into the substance of the Testicle. In the posteriour part, this coate, all after the length thereof, hath strongly growne to it, all the foldes of the vessels carryng seede, coueryng the Testicle, there also beyng broken into, with many holes not easie to be sene. Each where els, on the outside, it is smooth, washed over with a watrish humoz, and knit wholly to no part: on the inside, it groweth euery where to the substance of the Testicle. This coate, with the auncient Grekes, is called *Dartos*. The first professors of Anatomie, which named the Testicles *Didymoi*, haue called it (sayth *Vesalius*) *Epididimos*.

*Columbus* not onely not subscribeth hereto, that is to say, that this *Epididimos*, and next of all encloseth the substance of the Testicle, but sayth flatly, there be in y<sup>e</sup> upper coates to the Testicle, how soeuer *Vesalius* sought them, as *Erythroides*, *Dartos* (which two are now lately described) and *Epididimos*: which *Epididimos*, he alloweth not to be the auncient name of *Dartos*, but of the thyrd tunicle, which doth immediatly bewrappe the substance of the testicle: beyng white in colour, and in makynge thicke, that it might playne appeare, those to haue erred, which called *Epididimos* that faldoyng together of the vessels, that appeareth aboute the Testicle.

Whether of the Testicles, singular veynes, and arteries are brought, one differing from an other in beginning: for the veyne commyng to the right testicle, fetcheth his beginning from the trunk of *Vena cava*, lower then the goyng forth of those veynes that are reached to the kidneys, yet goeth not forth at the right side of the same stocke, but out of the superiour, and soze part thereof, a litle to the right side declining, and by litle, & litle, reached oblique towardes the right side, and stayed by *Peritoneum*, is caried downward. The veyne of the left Testicle, both not below his beginning from the stocke of *Vena cava*, but, springyng forth much higher then the right, breaketh out of the lower seat of the left Emulgent veyne. Sundry Anatomistes heretofore, sayng such diuersitie in the exorture of these veynes, imagined, that the left seminall veyne, was so begon from the

the Emulgent; so that it was necessary, that a false humour were caried to the testicles, by the long tricklyng wherof, by the way, to styre vp, in the tyme of torture, such great delectation.

*Columbus* (notwithstanding) confuteth wholly this opinion, in these wordes: I haue knowne many, who, hauing lost their left Testicle, to bechide whole of that kinde of rupture called *Incisionis*, haue confessed, and shewne vnto me diligently enquiring, that, in the same act they enioyed the like pleasure; as before tyme they had found.

Some Anatomistes therfore, haue not knowne how to disesse this case, & meane, for the unlike exorture of the seminall Veynes: others haue omitted to speake thereof; but *Columbus* (as his custome is) endeouyng to cure the vntaught of doubtfull myndes, hath exogitated a proper reason, and that beareth likelike hood of truth. These are his wordes: for asmuch as these seminall veynes are very slender, and litle, and that the great arterie is situated so neare to *Vena cava*, on the left side, which arterie neuer in liuyng bodies, ceaseth to mooue great, and euident daunger was eminent, that this slender veyne, in those continuall mowynge, should be broken. Which prudent nature wayng, to shunne such incontinencie, willed that the left seminall veyne, might fro the Emulgent be fetched, not from the trunk of *Vena cava*: least in descende it should lye vpon the great arterie.

These seminall veynes, in this order goyng downeward, are committed to *Peritoneum*, by fibrous knittings, which, in degeneratyng, make the an other coate. And to either of these veynes, the felowshipp of an arterie is committed: for the beginning of both the arteries, is lower then of the veyne goyng to the right Testicle: they are taken forth in the middell of the anterior part of the great arterie, one directly agaynst an other, and neare themselves, and the right crossing obliquely ouer the trunk of *Vena cava*, so descendeth, and hatheth downeward to the veyne of the right Testicle. The left commyng to the veyne on his side is sometyne wantyng (sayth *Vesalius*) and, for that, the veyne of the left testicle is larger farre then of custome. But to spring out of the arterie of the left kidney, is scarce at any tyme sene: although, to chaunce sometyne, it is not impossible.

The right veyne, and arterie (the like is to be vnderstande of the vessels on the left side) beyng together, after a space, so contingent, and mutually growyng together, as that most elegantly this word of the Grecians *Anastomosis*, may be to them applyed (although the like may be sene also in sundry veynes, and arteries in the body, and chiefly in the armes, & legges) they lye to *Peritoneum*, tyed with Fibrous or Membranous knittynge, and, in bended sort, reachyng downe the right side, are caried aboute that passage, which bringeth Urine from the right kidney to the bladder: in their progresse, pouyng out very small twistes, and slender furcles, to *Peritoneum*: but so sone as these vessels are come to that part of *Orpubis*, whereas the vii. of the Muscles, mowynge the thigh, is caried; aboute the huckbone, downewardes toward the lesser or inner Proccesse of the thigh, there (I say) those vessels, neare to *Peritoneum*, do pearse through the side of the same Muscle, so, slipping forth of the large scope, or amplitude of *Peritoneum*, fall downe to the peculiar coate of the Testicle, together with a litle Serue, produced sometyne from a braunch of the vi. payze of sinewes of the brayne, lent out among the rootes of the ribbes, but other whiles from the xij. payzes of the Serues of the Spynall marey.

For coner the hole of *Peritoneum*, that thus transmitteth the vessels, with the Serue, is not so euident, as if one should put a penne in the mouth, or strike it through a paper; but *Peritoneum* most exactly groweth to the sides of the vessels, and to that coate, which it reached vnto them, in the progresse, beyng as yet with in the copasse or scopeth thereof, safely sendyng them, no otherwise, then as *Septum* 131. y.

Col. Loc. Cii.  
The opinion of some Anatomistes as touching the beginning of the left Seminall veyne.  
The confirmation of that opinion.

The crew cause why the left Seminall veyne beginneth at the left Emulgent.

The beginning of the seminall arteries.

The progresse of the right Artery. Loc. Cii. The left.

The progresse of the right veyne and Artery after they touch together. Col. Loc. Cii.

Vesalius.

The hole through which the vessels passe out of Abdomen.

The inside of the first coate how it is.

What the first coate of the testicles hath common with Membranes.

The use of the first coate of the testicle.

Why y<sup>e</sup> first coate is called Erythroides.

The situation of the second coate of the testicles. Whereto the vessels do growe.

Where are inserted the vessels carryng seede.

The name of the second coate of the testicles. Epididimos. Col. Lib. 1. Cap. 14. The coate to the testicles after Collocus and which which is Epididimos.

The third coate in the testicles. Epididimos is not the folding of the vessels.

Col. Loc. C. The veyne to the right Testicle.

The veyne of the left testicle.



*transuersum*, and the Membranes wherewith it is clothed, do offer way to the stomach, and hollow beyne. But so soone as these vessels haue passed the hole of *Peritonaeum*, they are led from the right side, after a certaine sort, agayne obliquely downe towardes the left, so brought to the vpper part of the right testicle, in this last descente, one with an other mutually mixing as aforesayd, and effourmyng one body like a pillar deppressed befoze, and behynd, whose crest, the first meeting, and mixing together of the vessels make. But the foundation is that part, wherby they are committed to the vpper part of the Testicle.

About this body ten thousand branches confusedly are packed, nether all of them directly proceeding downward, but some partly straight, partly round compassing, partly ouerthwart, others appeare folded in other order together: and it is impossible to follow one manner or order of their tracing.

Whilist so many enfoldinges of branches are made in that Membran, which *Peritonaeum* offreth there to the vessels, wherby they cleane vnto it with Fibrous knittynge, that body seemeth to represent the skinned in the calfe of the legge of some rusticke, or labouryng person, which is newly swelled, with the tumours called *Varietes*. For as therein we may perceiue the beynes, diuersly, and altogether vnequally, with straying traces, in abundant sort to wander: so likewise in this body of the seminall beyne, and arterie, innumerable branches are scattered. For the which similitude certainly the auncient Anatomistes haue called this body *κισσοειδης παραστάς*, as one should say, a swelled body to the Testicles assitant. This, in the seate, or foundation thereof, groweth to the vpper part of the inner coate of the Testicle, which we haue sayd to be called *in ididymos*, and distributeth also many branches, straight pearcing this coate, to the vpper part of the Testicle, many wayes among the substance of the Testicle, like as the beynes of the liuer, into the substance thereof disseminated, consisting of a very thynne coate. This is the order of the seminall beynes, and arteries, whiche also are named *Vasa preparantia*.

So that mutually folowing of the vessels together, by a maruailous arte was deuised: for thereby it is brought to passe, that the same matter of seede, whiche first is red, should begin by litle and litle to be prepared, altered, and made white. By which elapozation begon, no doubt, a great part of labour to the Testicles is diminished: which wholly had belonged vnto them, had not the folowing together of the vessels, ministred vnto them helpe, as more hereafter.

**A**t the outside of this same *Varicosum corpus*, where it is to the Testicle appointed, another white and hard body, after the manner of a harder sort of sinewes, groweth to the inner coate of the Testicle, and thence begynneth. This on the outside where it is not committed to the Testicle, is Gibbous, and round after a sort: but on that side it groweth to the tunicle it selfe, it is hollow, according to the conuered shape of the Testicle. This body is caried, from the outside of *Varicosum corpus* to the hinder part thereof, and downe by litle and litle creeping towardes the interior partes, after the posterioir region of the Testicle, groweth fast to the inner coate thereof, so long, untill it haue descended to the lower seate of the Testicle, whence forthwith it is vpwardes reflected, stretchyng forth, and lyng to the inner coate of the Testicle, but not any more growyng to it, nether reteynyng the same forme. For all the way whereas that body is knit to the coate of the testicle, it is almost of equall thickness, and alike figure, which to the tendrell of a vine, or gourd, which windeth or turneth thicke about any thyng, may be assimilated.

Although (notwithstanding) it turneth not about, or in round compassed wyndynges, as both the tendrell, but as it were from side to side: like which reuolutions, a snake, or ele in creppynge maketh. For the turnynges, anfractes, or inuolutions

tions of this body, are very continuall, and together growyng.

After this sort therefore, that body groweth to the inner coate of the Testicle, and is on the outside, the impressions of those inuolutions beyng taken away, smooth, but on the inside, beyng with a sharper instrument remoued, from the inner coate of the Testicle, rough, yet pearced with no wayes, or pores, that may be sene. Nether is it sene otherwise hollow, not onely where it groweth to the coate of the Testicle, but nether also where, from it departyng, it is caried vpwardes. For allone as it hath descended downe to the inferior part of the Testicle, in the straight reflexion thereof by agayne, it is made, by litle and litle, narrower, & roüder, no more wreathed, but endeth as at a round sinew. And that chiefly in dede it doth, whereas, by clymyng vpward, it surmounteth the vpper part of the Testicle. Whether so soone as it is come, it is layde to the fore vnture of a thynne Membran beyng knit, it proceedeth somewhat higher, and is therterto returned, whereas *Vasa preparantia* came forth, entryng through the same hole, which is made in the Tendons of the ascendent, descendent, & oblique Muscles of the belly.

But immediately after it is come into the capacite of the belly, it boweth downeward, neare *Os pubis*, and under the bleedbar, where, more and more it is amplified, and agayne neare the endes, much enfolded and wrythen, untill at length it is implanted among the Glandules called *Parastata*, which, about the rote of *Penis*, and borders of the bleedbar, are placed. This description is to be applied either to the right, or left of the vessels *Deferentia*, for so both of them, after one prescript order, begyn, & go forthward under the bleedbar, about the straight gutte, and at the same Glandule, mutually meetyng, do toyne together, constitutyng one body, in which their folowes, wrythes, obuolutions, and Glandules, so much seede is contained, as might suffice to the generation of three or foure children, especially in frutefull bodies.

Wherefore let it be no maruell to vs, which Aristotle propoundeth, as a thyng to be wondered at, in that a Bull did engender, notwithstanding that his Testicles had bene cutte off. As therefore the other foure befoze described, are called commonly *Vasa preparantia*, as vessels first preparyng the matter of sperme, so these two last spoken of, are called *Deferentia*, as we should say, bringyng the seede. For in dede they receiuyng the same at the substance of the Testicles, do bring it to the yard. The insertion of this kinde of vessell in the yard is not easie to be sene, and is opened onely in tyme of coiture, and excretion of seede.

**B**ut the Glandulous body, in which the vessels *Deferentia*, after their meeting together, are inserted, whiche also they call *Glandula Parastata*, as is lately sayd, is repored in the lower part of the bleedbar, in the middelt after a sort, betwene the body of the bleedbar, and necke thereof. It is one body, and moreouer greater then the Testicles them selues, albeit not exactly round: for befoze, & behynd it is deppressed, but on the sides, round as a boole. Through the middelt thereof the conduit of the bleedbar proceedeth, whiche is, in this place somewhat more large, and ample, then in the rest of the progresse: but not pearced through, of the vessels bringyng seede, that manifestly can be sene, but onely rough, vnequall, and wrinkled, chiefly in the posterioir part, where the goyng in of the bringyng vessels, sometyne to the diligent dissectioners, are playnly apparant.

**N**ow it resteth to expresse the vses of these singular described partes. It is euident to all men, that the substance of the Testicles, by a peculiar facultie begotten to them selues, doth make seede of that matter, which the beynes, and Arteries bring, and carie throughout the Testicle, as doe the Veynes, through the liuer, the blood. But the best portion of the blood, and spirite, the

Col. loc. cit.

The progresse of the bringyng vessels, after they are come into the capacite of the belly.

Vesal. Loc. cit. Where the bringyng vessels doe meete, and toyne together.

Col. Ibid. What seede is contained in the Glandules and folowes of the vessels.

It is no wonder why Aristotle made of the bull that began and wrythen his testicles.

Why the first, iij. are called *Vasa preparantia*. Why these ij. are called *Vasa deferentia*.

Vesal. Ibid. The insertion of the bringyng vessels to the yard. The situation of the Glandulous body called *Parastata* Glandula. The magnitude and figure of the Glandules *parastatae*.

The use of the substance of the testicles.

Crispoides parastatae.

Epididymos.

The Seminall beynes and Arteries are called *Vasa preparantia*.

Col. Loc. cit.

The vse of the folowing and wrythen of the seminall vessels.

Vesal. Loc. cit.

The history of the vessel bringyng seede from the testicle to the necke of the bleedbar.

It is not meant round every way as a globe but long, and thertvith round as a staffe.

Where the tendrell of the vine, or creeping of a snake compared to the bringyng vessel.

Wh. ij.

through

veynes, and arteries of the Testicles. do early, with a long and continuall progresse, wretched with innumerable revolutions, to the perfect preparation of matter, for the making of seede. Neither is that said brought into any one large arterie, made in the Testicles to receive it, but is distributed into many small vessels, made of the same so thinne a coate, dispersed throught out the substance of the Testicle. And like as is sayd of the substance of the liver, so likewise the substance of the Testicle, by his infused facultie, addeth unto the bloud, and spirite, contained in his vessels, the perfect nature of seede. And this force, in men, is the cause of strength and manhode, and in women (if so we may say) of womanhode.

Furthermore the seede prepared of the Testicles, innumerable (though very small) porie wayes do reach into the folbes of the bringyng vessel, growing to the Testicle, thence agayne, out of both the Testicles, contriving seede to be ejaculated, and cast forth into the matrice. But the bringyng vessel is, above the Testicle, writhen with so many turnes, and windynges to the end, that sooner, and in more copious sort, it might receive seede from the Testicles, as also that the seede from it might likewise obtaine some elaboration. But the applantation of this vessel to the testicle, with most strete, and small holes, is brought to passe by the interuenture of the inner coate of the Testicle: because the vessel is hard, strong, and thicke, for so it was requisite, to beare out iniuries, but contrariwise, the substance of the Testicle to be slacke, and soft. So that prudent nature either here, or els where, hath not ioynd in one, those which in essence were contraries, except onely by the means of some indifferent substance, put as a mediatur, of frendshipp and amitie betwixt them. In how much therfore, the inner coate of the Testicle is, in hardnes, inferiour to the vessel bringyng seede: therein, the same coate, by so much agayne surmounteth the Testicles: although not round about, but onely in that place, where the seminarie vessels grow to it. For here it is softer then any where els, and pearced through with small holes, as is sayd.

Neither both this vessel growe to the Anterior, but posterior part of the Testicle, that now, whilst it may reach, or containe the confectioned seede, for the Testicle alone doth confect it, it might be repored in a safer place, vizing the Testicle in place of a propugnacle. And by the same reason, when the vessel entereth into *Peritonaeum*, under the Veyne and Arterie it is woorthely hidde, that it might containe seede, with bloud, and spirite, of which the seede is more perfectly prepared.

Finally, the right vessel both coite and ioyne with the left, and so both into the necke of the bladder are insinuated, that, at once, the seede of both the Testicles might be projected and cast into the wombe. The vse of the Glandulous body is to moflen the way of Urine, and seede, and to be as an underfet, or proppe, like as of the wayes digested through it from the bringyng vessels, so also of the Veynes, Arteries, and Nerues, distributed to the body and necke of the bladder: yea, and peradventure may seme to adde unto the seede a certaine perfection, and to be expedient for the generation thereof, sayth *Vesalius*.

It besides, unto man, for the apt acte of generation, the omnipotent maker hath given a member (called in Latin *Coleus penis, mentula, virga*, or *Pudenda virile*, in English the yard) most fit for the effusion of seede into the wombe: which in the tyme of carnall societie, ought to be swelled, stiffe, and erected, but so to remayne at all other tymes, it should become unapt to vse, and easely injured, no otherwise, then if the hand should alway be bozne extended.

When as therfore it was behofull, that sometyme it should be slacke, tender, and soft, and at other tymes extended, and swelled, it seemed expedient that the yard were made of two bodies, large and hollow within as a sponge, which should

should, being filled with spirite, be erected, produced, and notably swelled, but the same spirite once dissolved, they incontinent become slacke, narrow together, sagge, and softer.

The figure, and situation thereof to all is well knowne, but the substance to very fewe, although most woorthy to be knowne not consistyng in vulgar speculation. For in man, the substance of the yard is not bony like as in a Wolfe, Foxe, or Dogge: for in vs if it should haue bene so, it must needs haue bene continually stiffe, and hard as a stick, which in sundry causes must needs haue bene an impediment vnto vs.

Neither is it Cartilaginous, nor of a Ligamentall substance, nor Musculous, nor sinewy, neither a Veyne, Arterie, nor Membran. Although of these, some appertaine to the making thereof. But none of these, taken alone, was applied to the making of the yard. Neither could they haue shewed, for what cause, parent nature had begotten the same.

For it was not onely done for the emission of Urine, but to ejaculate seede into the matrice, for procreation sake. For this cause (as also is sayd before) in man, the yard was made of a certaine substance, which may either be erected, or enfeebled, made stiffe, or bendyng.

It is therfore (I say) of very right spongious, rare, and porie, almost like the substance of the Splene, albeit nature hath enuised it with thicke Ligamentes, which together with the rare substance of the yard, take their begynnyng from the inferiour part of *Os pubis* (not from the superiour, as Galen supposed) and hauyng in the fundament a fleshy begynnyng, stretcheth forth with towards the vpper partes, but about the middest of *Os pubis*, the right begynnyng with the left, is vnited, and ioynd together: then being inflected downward, are implanted to the borders of Glans, whiche Glans is harder then the other partes of the yard. The right Ligament, with the left, after the length of the yard, is vnited.

But because the substance of the yard, did then consist but of a rare, and porie ioyning, or setting together, and for that it could be litle apt to the necessary erection in coiture, (since scarce sufficient helpe was purchased by the onely benefite of the Ligamentes:) prouident nature poured forth two Arteries, through these aforesayd bodies, which are, from the roote of the yard, caryed euen to the extreme end of Glans, but so, as that by the way almost an infinite number of branches are dispersed. When lust therfore stirreth to the generation of a new man, she poureth forth great force of spirites throughout those Arteries, & hearie branches, by whose helpe, the same substance before, wrinkled, weak, and bendyng, is now lifted vp, erected, made stiffe, and hardened. But the Ligamentes aforesayd, do as it were proper and underfet the same, being of them selues thicke, both for this sayd cause, as also least the spirites should ouer hastily vanish away, being waited. These Arteries, and their offices, *Columbus* boasteth no man before hym to haue rightly knowne: by whiche also (sayth he) nourishment is brought vnto the yard, whilst elles, in the yard is no Veyne, nor any Nerue, notwithstanding that *Vesalius* is of cleane contrary opinion.

Beside these partes hitherto decided, which nature deuised for the framyng of this instrument, there are also foure Muscles, which in the second booke of this History, are sufficiently spoken of.

There is besides, that common way, or passage, destined both to seede and Urine, which, under these two bodies, is conuayed, neither is it any thyng els (sayth *Columbus*) if it be rightly wayed, saue the substance of the bladder lengthened out to the end of the yard.

Col. Mart. Cap. 17.  
Figure.  
Situation.

The substance  
of the yard.  
Why the substance  
of the yard is not  
stiffe.

The vse of the  
yard.

Glans is the  
head of the yard,  
the thicke one  
whiche is called  
preputium.

The arteries to  
the yard.

How the true  
erection of the  
yard happeneth.

The vse of the  
Ligamentes of  
the yard.

In the yard is  
neither veyne,  
nor nerue,  
Loc. cit.

Inflected to the  
yard.  
Col. Loc. Cit.

The passage com-  
mon to seede and  
urine.

Of what the com-  
mon passage cons-  
isteth.

## The sixte Booke of the History of Man.

Why there groweth  
no fatnes vnder  
the skynne of the  
yard.

What is Præputium.

The Hebrewes  
saie præputium.

Vesid. Loc. cit.  
Sutura.

Perizon.

Why the partes  
of women are  
not here spoken  
of.

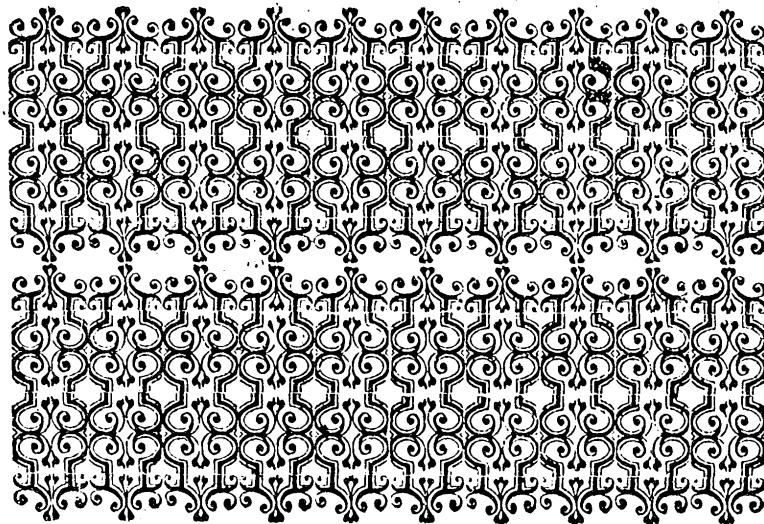
All these are covered ouer, and clothed with *Cuticula, Cutis, and Cornua Membrana*, without fatnes altogether: which here for motion sake is wantyng, lest supernaturally therewith encreasing, it might be greuous to the matrice.

The extreme part of the yarde is called *Præputium*: beyng that skynne where-with Glans is covered, so, in the acte of venerie, now vpward, now downeward, to the excedyng delectation of the Female, moued: this is that, whiche the Hebrewes, in tyme of Circumcision, lose. The lyne vnder the yarde, maryng after the length therof, is called in Latin *Sutura*, for so it representeth the fashon of a seame. As the part betwene the inuolucere of the Testicles, or purpose of the stones, and the fundament, is called *æpivōdyv*, That is *Interfeminium*.

But because I am from the begynnynge perswaded, that, by listyng by the bayle of *Partures secretes*, in womens shapcs, I shall commit more indecencie agaynst the office of *Decorum*; then yeld needefull instruction to the profite of the common sort, I do here ordaine the vi. rest of these my labours.

### An ende of the Historie of the Generative partes.

¶ Of



## ¶ Of the History of Man, the vij. Booke: of the making of the hart, and of the Instrumentes ministering to his function: commonly called,

*The Vitall or Spirituall partes.*

89.



Before you all whosoever you are (most attentive Readers) I freely protest, that hether to my penne hath not wauered in the doubtfull balauce of ambiguitie, but passed the playne pathe of truth, guided by the footstepes of my forerunners: till now at length, beyng come to a place somewhat ascending (as they that will attayne to the scope of their desire, must not refuse the hill with the dale) I finde the steppes of some willingly yeldyng to so tedious a Iourney: others, with senses unappalled, to haue plowed a path directly ouer the moitaine: here I see one willingly walking a

contrary way: and there another, praysing their endeouours, but protesting him selfe onely to haue light in the nearest way. So that here, no maruell, though I should stand amazed, and as one plunged in the depth of contrary streames.

For *Galen, Vesalius* & diuers others, as touchyng the instrumentes that restore the ayre substance, whiche continually waste, and refreche the innated beate, are contented to affirme, that, of the ayre drawn in by the lunges, part is receiued by the furcles and bzaunches of the veniall Arterie, and there hence, beyng prepared by the elaboration of the lunges, is by the same vessell carped into the left ventricle of the hart, where, meetyng with the blood lately strayned throught the hedge betwene the ij. ventricles, it doth together by the working of the hart, ordaine that famous composition, the vitall spirite.

Contrariwise *Realdis Columbus* sayth, that the blood, sent from the right ventricle of the hart, by the arteriall Veyne, into the lunges, there takyng the mixture of ayre, is drawne, by the veniall arterie, into the left ventricle of the hart, whereas, beyng almost made before, it is now perfected vitall spirite.

Albeit I am not ignozant, how lately, both these assertions are denyed: *Leonardus Botallus* prouyng that blood is bzought into the left Ventricle an other way, that is, by a proper Veyne that is found somewhat about the cozonall Veyne, neare adioyning to the right auricle, thence with direct tract marchyng to the left: which contrarietie notwithstanding (lest I should seeme to confound the History of the vital members): I haue thought good to describe the partes after the best approued, and that in such wise, as there shall appeare therein great perspicuitie, and likelihood of truth. Yet not that I meane to reiect *Botallus*, although he hath neither distinctly set downe the deriuation of that Veyne, neither apertly the insertion therof, but because the labour of him shalbe lesse, that endeavoureth, alone, to stoppe the runnyng streame, accomplyng any duety done (right courteous Reader) in describing the partes, to haue forewarned thee of this late inuention.

As to the which description that I may briefly come, I will omit further circumstances: onely to do away obscuritie, I meane, that the whole be not maymed, by wantyng part, it behoueth to begyn at the pannicle coueryng the ribbes, & thence to the other partes, contained within the capacite of the brest.

The coate therefore of Membran to all the ribbes (beside the xij. on each side occupied with the implantation of the midreife) and to the whole brest bone

¶ C. i.

Ende.

The opinion of  
Galen and Vesalius  
how blood cometh  
into the left  
Ventricle of the  
hart.

The opinion of  
Columbus.

Leonardus Botallus.

Vesal. lib. 6. cap. 2.  
Of the Pannicle  
called Pleura.

underreached, and covering the bodies of the Vertebres of the brest; and the upper part of the midzeif, towards the amplitude of the brest, is named in Latin *Succingens*, and commonly called *Pleura*.

In the posteriour part it toucheth along from the first Vertebre of the brest, downe to the xj. out of which region, consisteth that part of the midzeif, that transmitteth the great arterie, but in the forepart, it descendeth from the cannell bone, to the lower part of the brest bone, whereto the midzeif groweth. In the sides as gayne, from the first ribbe, to the upper face of the midzeif, which respecteth the cauitie of the brest, thus clothing it, and also the whole amplitude of the brest.

This coate, like as the cauitie of the brest, in figure varieth very much. For in the upper part, accordyng to the brest, it is streit ended as it were pointed, in the lower part broader then above, but in the sides of the brest broader then in the inferiour part. Wherever in the fore part it is much thicker then behynd, by reason of the obliquely situation of the midzeif. It toucheth from the poynte of the brest bone, to the xi. Vertebre of the brest. Also in the fore part, and in the sides, outwardly, even like to the brest it selfe, it is in figure Gibbous, or bunched forth; but in the posteriour part, longwise, as it were to the amplifying, and enlarging therof, it obtaineth an inward impression, after the order of *Peritonaeum*. For the bodies of the Vertebres are apparaunt, or prominent into the cauitie of the brest, like as the rootes of the ribbes, which are somewhat reflected backwardes from the bodies of the Vertebres, untill, forthwith proceeding towards the anterior partes, they are downwardes oblique. This Membran inwardly is (for the most part) smooth, and as with a watry humoz, overnoyted. Besides, where it reacheth forth certaine Membranous Proceses, by which it either yeldeth out other Membrans, or gathereth some peculiar body unto it.

Sometyme there is found, although very seldome, a harder kinde of fat in the inside of this coate, no otherwise then to *Peritonaeum*, and that especially, where it is nearer to the Vertebres, and where the chiefest veynes therof are guided.

Wherever here, and there, on both sides, it putteth forth Membranous Fibres to the lunges, whereby the lunges are thereto very fast knit. And to the involution of the hart, where the same coate couereth the midzeif, in great scope, is continued, & tyed. But the outside of this Membran, which groweth euery where to the partes adiacent, is rough, and bnequall, after the manner of Membrans connected and tyed together.

It is perforated as oft as the midzeif, since it couereth it, that is to say, twice, not thrice tymes, as *Vesalius* would: once for the descense of the stomach or upper Orifice of the Ventricle, and the second tyme for the ascense of *Vena cava*: but in daide the great Arterie, runnyng close by the body of the Vertebres, cannot perforate the same, but is rather crossed over therewith, or to be playne, the midzeif rather seemeth to giue backe to the side thereof. Under the Cannell bone, it is not pearled with a large and continuall hole, but the vessels which creepe vnto it thether, it containeth with very many holes, and groweth vnto them. Here likewise it transmitteth the branches of *Vena cava*, and *Arteria magna*, as also the stomach, rough Arterie, the Perues of the vi. payze of sinewes of the bzaayne, and the Perues to the midzeif. Last of all, in the hinder part, it is perforated, after the longitude therof, and that on both sides, with an orderly concert of Veynes, and Arteries, entreyng forth, that way, to the spaces of the ribbes.

This coate is in substance Membranous, to wit, hard, thinne, equall, and somewhat, in strength, surmountyng *Peritonaeum*. And like as *Peritonaeum*, so also the substance of this Membran, is, at the backe, harder, then neare the brest. For the begynning therof, is taken from the Ligamentes, which bynde together, the bodies of the Vertebres: vpon those, I say, it chiefly doth depend. But it is

not

not simple, although *Vesalius* espyed not the contrary, but double: I meane not the right side, and the left, but that euery where this Membran *Pleura*, is thow folde, or double, or simply flos Membrans, the one interne, the other externe, betwene which Veynes, Arteries, and Perues do styde: all which are carryed betwene the spaces of the ribbes. Whence it happeneth, that, there, many tymes, springeth inflammation, with much tension, and prickyng dolour, called the Pleurific. *Columbus* indgeth the cause of this duplication the deape dearterie of *Spatura*, that so, the outer might defend the inner Membran (then which nothyng is more sensible) from the rigour of the ribbes, which should haue bene profered, alway, through the perpetuall motion of the lunges.

Beside this succingent coate, the ribbes haue to them, one peculiar, which is no other, then the Membran common almost to all bones, called (in that it couereth the bone) of the Greekes *Periosteon*. But *Pleura*, in that it bewzappeth what soeuer is contained within the concavities of the brest, doth, like *Peritonaeum*, lend coates to all the partes contained, firmly thereby knittynge euery organ to other. Last of all, it so properly prepareth way to the Perues of *Septum transversum*, as that it deduceth them, bid as it were in a scaberth, to it. This, for the vse therof, in that it clotheth, defendeth, and strengthneth the inner partes, is called a coate: but as touchyng the substance, a Membran.

This Membran, or rather these Membrans, creepe downward after the sides of Sternon, towards the Spine, the right among the selues beyng distant from the left: and beyng so fastened to the same spine, do diuide the brest into y. cauities, and the lunges into two partes: neither, that rashly, but that, one side beyng hurt, the other (not withstanding) might escape free, and serue to nature's vse, & retaine at the least halfe their action. This reduplicatio (as we may call it) of *Pleura*, is in this place, called *Medastinum*, because it indmeasurith the brest, beyng led from the toppe of the brest, to the bottome, or lowest part. Betwene *Medastinum*, that is, this double *Pleura*, diuidyng the brest into two, some matter may be gathered, which, Sternon beyng perforated, may be drawne out, by a diligent Chirurgian, and in Anatomical practice expert.

Within the upper part of the brest, where the veynes and arteries are denuded, appeareth a certaine Glandulous part, called *Thimus*, which in Calues, and such others creatures, is most pleasaunt to be eaten. I suppose we call it the swete bread.

About the middest of *Esophagus*, are two litle Glandules, placed there of nature to humect, and moisten that passage.

There is a certaine coate, common to the inside of the nostrils, to the palate, and to the toung, and it seemeth to be a portion of *Dura mater*, or the hard Membran of the bzaayne, which, after it is crept forth of the Scull, is amplified, made thicker, and almost fleshy: wherewith when as the whole palate within, and the mouth is clothed, as the furthest part, or extremitie of the palate, it becometh double, and somewhat lengthned, constituteth a round, long, and litle thicke pendule, called by diuers names: as *Vna*, *Vnula*, *Columella*, *Gargareon*.

The office of it is to deteyne the humiditie fallynge from the bzaayne, neither that in bayne, but beyng there holden, to moisten those partes, whose motions are perpetuall.

Neither doth it meanly auayle to the utteraunce of voyce, and pronounciatio, as apparauntly we are taught, by the example of such, as long haue laboured in the Spanish discafe, to the utter ruine and vastation of this part: how afterward (I say) they speake rather after the manner of crowses, then men.

A thyrd vtilitie also hath this same *Gargareon*, and that is, lest the dust, which sometyme meeteth vs at binwarcs, our mouthes beyng open, should infect and trouble

Col. Lib. 1. cap. 1. Pleura consistens of Membrans.

Col. Lib. 6. Agho. com. 33. Where happeneth the Pleurific, by Pleura consistens of it.

Col. Lib. 1. periosteon.

The vtilitie of Pleura.

2. Pleura is called a coate and how a membran.

Col. Lib. 1. cap. 1. The plogreffe of Pleura.

Why the lunges are diuided into y. partes.

Medastinum.

In Medastino matter may be gathered and also drawne forth.

Thimus.

The vse of the glandules of Aesophagus.

Col. Lib. 1. Cap. 1. The coate to the nostrils, palate and tongue.

Vnula, and the office thereof.

2. The defect of Vnula what ensueeth.

1.

Col. 11.

trouble

The figure of Pleura.

Fatte.

The tyng of the lunges and pericardium to Pleura.

The perforations of Pleura. Col. Lib. 1. cap. 1. The great arterie doth not perforate Pleura.

Col. Lib. 6. cap. 2.

The substance of Pleura.

The beginning of Pleura.

Depicted to Vind. 1.  
Vind. Lib. 6. cap. 6.

To whom the  
drawing of cold  
ayre much hur-  
teth.

Col. Loc. etc.

The Glandules  
called P. Almond.

Pharynx.

The structure of  
the Glandules  
Parathyroides.

The situation of  
the lungs and  
division.

Figure.  
Why the lungs  
are inwardly bot-  
tom.  
Why the lungs  
is divided into  
lobes.  
Col. Lib. 6.  
Why the lungs  
is divided into  
more lobes in  
beastes then in  
men.

The substance of  
the lungs.  
The structure of  
the lungs.  
The vessel in  
the lungs.

The description of  
Aorta Arteria.  
The use of Aorta  
Arteria.

trouble the rough arterie, whiche this rather intercepteth by the way. Veynes, into the middle thereof, it receiveth from those branches, sent to the coate of the palate, but, with Perues, both participate little. It is evident also, that, to what persons this Gargareon is wanting, to such, the cold ayre is much more greivous then to other men as testifieth Gal. Lib. 1. de us partium.

**O** both sides of the talves are two Glandules: one on the right side of Gargareon, and the other on the left: and they haue to name *Parathyroides*: *ton- sille, amigdalæ, fauces*: these also (beyng of Glandulous substance) were made to the receiuing of the humiditie of the bryane, & therfore were they placed thus in the talves (called of the Grecians *Pharynx*; of the Latins *Fauces*) to minister unto them moisture. But the talve is contained within these borders, the foundation of the head, and palate, the anteriour bodies of the Vertebres of the necke, in which place, sundry, and many organs appeare: as the toppe of *Trachea Arteria* called *Larynx*, the bone called *Hyoïdes*, and his Muscles, the rote of the toug & his Muscles, the by-payre of sinewes, & inner veynes called *Inguiales*, the arteries *Carotides*, *Gargareon*, the neither talve, and a portion of his Muscles, the Processes *Styloides*, and the stomach or *Esophagus*. Therfore these same Glandules, beyng used in so strete a place, are, from the elders, called *Parathyroides*.

Embrazed they are in the same Membran, wherewith we haue sayd the mouth and palate to be clothed: which, further descendyng, runneth to *Esophagus*, constitutyng his interior coate: as also the inner clothing of the Ventricle, and intrels: and yet more downward, behind the toung, inuetheth the Epiglottis, *Larynx*, and the rough arterie, euen to the extreme partes of his branches disper sed throughout the lunges. But the outside of this rough arterie is shrouded vnder the succingent Membran, called *Pleura*. And thus much, beyng exactly wayed, is sufficient for these partes.

**T**he lunges are sited in the brest, wherof the greater part they occupy, beyng bound to the bodies of Vertebres, to the hart, and to the rough arterie: into two partes this agayne is deuised, a right and a left: wherfore some infer that there be two lunges. The figure of it outwardly is round, inwardly hollow: & that necessarily, since so it behoued it to yeld vnto the hart, and *Pericardion*. But besides that diuision, this instrument, the lunges, is deuised (to the end it might both be more agile, and easie to moue, as also, more aptly to embrace the hart) into foure lobes, not into five, as in beastes Galen approued. Which diuersitie is thought to happen, because in them the liuer is much distant fro the hart. Wherfore when the hollow Veyne, so long way from the Vertebres, is distanced, it required a bolster, wherewith to be underlayd: so that prudent Nature then willed, that the lunges, in beastes, should by one lobe, surmount the same instrument in the body of mā: which lobe, in those creatures, is strewed vnder the hollow Veyne: but it is hollow, as Galen most excellently hath sayd, because it giueth place to the roundnes of the hollow veyne. But since that in man, betwene the hart, and liuer, onely the midzeif lyeth, there was no neede at all of the v. lobe.

The substance of the lunges is rare, light, and pozie, as a sponge, in colour somewhat red, which kynde of substance the elders haue named *Parenchyma*. i. *Affuso*. It is inuolued of the Membran *pleura*, lately described, beyng there very pozie. Through this instrument, the lunges, these vessels are disseminated: so wit, the rough arterie, the veniall arterie, and the arteriall Veyne.

The rough arterie is caried in through the longitude of the necke, in the fore part vnder *Larynx*, consisting of gristelly ringes, but not perfect ringes (as in the Viscery of Cartilages appeareth, where the rough arterie is at large described) which deuidyng into a right & left first, and those, by little and little, into many others, is waisted, in branches, to the extreme partes of the lunges. The office & service

service which it oweth to nature, is to carie ayre, both in, and out: and from the upper partes proceedyng, goeth downe to the lower.

The veniall arterie, from beneath, is caried almost straight upward, beyng first also deuised into a right, and left part, then diuers wayes ramified, and ap- prochyng to the branches of the rough arterie.

The same likewise doth the arteriall veyne. Thus these three vessels are em- braced of a substance rare, light, and pozie, thus beyng the lunges engendered.

Whose vse is, as the Anathomistes rightly write, for the colyng, and refrige- ration of the hart: this effect beyng wrought, by the bryngyng of cold ayre vnto it. And who likewise knoweth not, that the same both serueth to inspiration, ex- piration, and voyce.

All which offices, of right appertaynyng to the lunges, I can proue by the testi- mony of enery Anathomist: since heretofore, as with one consent, they accord & is one together: but severally *Columbus* addeth one of great effect, and nothyng touched heretofore of any other. For it is (sayth he) the preparation, yea almost the gene- ratio of vitall spirites, which after are perfected in the hart. What is to say, the in- spired ayre it receiveth, through the substance of the lunges: the which in- strumēt ceaseth not to mixe the same ayre, with that blood, which is brought vnto it, by the arteriall veyne, from the right ventricle of the hart. For this same ar- teriall veyne, besides that it bryngeth blood, for nourishment, is so large, as that it may serue for other vse also. And this blood by flying, through the continuall mouyng of the lunges, is made thynne, and together with the ayre mixed, which thus, by the same refraction, and beatyng together, is prepared: so that, the ayre, & blood, together mixed, are receiued by the branches of the veniall Arterie, & at length, by the trunk of the same veyne, sent into the left ventricle of the hart: but so well mixed, and attenuated together, as that to the hart, small labour at all is left: after which small elaboratio, the hart (as it were) laying to the last hād, to the makyng of the vitall spirites, that, by meanes of the great arterie, they might be distributed to all the partes of the body it was most requisite.

The which new assertion, or late inuention of *Columbus*, because it was like to be much spurned at, and by all meanes possible (especially of those that had sworne them selues to the decrees of Galen, and *Vesalius*) confuted, and reiected: the same Authour hath (as it were) entreated vs willingly to contemplate, first, the magnitude and largenes of the lunges, which without vitall blood could not endure, when as there is not the least particle in all the body that is destitute therof. But if this vitall blood be not begotten in the lunges: from what part might it thither haue bene sent, but from the great arterie: and thence (sayth he) not one branch, great, nor little, is conuayed to the lunges. For to this purpose, as touching the veniall arterie, or arteriall veyne, he demaundeth how, by them, vitall blood should be brought vnto the lunges, whilest nether of them doth beate: but serue for other speciall offices, as shortly more largely shall appeare.

There are little small Perues, which touch onely the coate of the lunges, but pearse not within: which maketh that the lunges are with very small sense en- dowed: not withstanding that it is a member greatly needefull, and so necessary. The coate wherof, since it is pozie, no marvel that in time of *Phleuresie*, & infla- mation of the lunges, it receiue blood into it, which spetle outwardly declareth.

To conclude, the lunges, so needefull to the refreshing of the hart, nature did not onely deuise, as also, lest it should be serued at any tyme with vnprepared ayre: but many creatures she would haue byeth, for the cause of voyce also, so re- quisite to their life and naturall beyng. What therfore, which is giuen out from the lunges in the tyme of expiration, is the excellent & notable matter of voyce.

Ec. ii.

The

The veniall Ar-  
terie.

The Arteriall  
veyne.  
The vse of the  
lunges.

How vse of the  
lunges.

How vitall spi-  
rites are engen-  
dered.

Why the largenes  
of the Arteriall  
veyne the blood  
bring out.

The vitall spirites  
perfected in the  
hart, are caried  
by the Arterie  
Aorta to all the  
partes of the bo-  
dy.

How Columbus  
satisfieth his opi-  
nion as touching  
the generation of  
vitall spirites in  
the lunges.

The Perues of  
the lunges touch  
his coate but  
pearse not.

How hapneth  
blowdy spetie in  
the phleuresie.  
Vesal. Lib. 6. cap. 7.  
The matter of  
voyce.  
Gal. Lib. 6. v. part.



Vesal. lib. 6. cap. 8.  
The innuolucere of  
the harte Pericardium.

Figure.

The perforations  
of Pericardium.

1.

2.

3.

4.

5.

Which is the  
seate of founda-  
tion of the harte.

The situation of  
pericardium.

The substance of  
pericardium.

The concavities of  
pericardium. Pericardium bea-  
reth no fat. Intersepiant  
membranes are  
those which  
grow about those  
vessels between  
the lunges and  
the harte.

Where pericardium groweth to  
Septum transversum.

The Membran enuolupng the whole hart, with his auricles, & begynnynge of the vessels, like a certaine casket, or case thereto, is called of the Grekes *Pericardion*, in Latin *Cordis innuolucrum*: some *Capsula cordis*, for that it is as a certaine house unto the hart: the barbarous number, by the addition of one letter pronounce it *Capsula*. But we will vse here to say the innuolucere of the hart.

The image, or portraiture wherof is very like unto y<sup>e</sup> forme of a Pine nut, haupng a round orbicular foundation, and a blunt poynt.

But the foundation of the hart is not continuall with the innuolucere therof, but at least pearced through with v. holes, whereof two yeld way to the hollow Veyne. That is to say, one, where the same doth perforate the midzeif. But the second hole is that, where the same Veyne, rising v.wardes from the foundation of the hart, goeth to the Cannell bone. The thyrd letteth in the veniall arterie. The fourth is prepared for the great arterie. And the fift yeldeth way to the arteriall Veyne. To the partes of these vessels, disaunt a notable space from the vpper face of the hart, this innuolucere groweth, after a sort fetchyng his begynnynge from them. The rest of y<sup>e</sup> innuolucere, transmittynge no vessel, is whole, and continuall, and every where alike, save that from the foundation downwardes (as is sayd) it stretcheth into a blunt poynt, after the fashion of the hart.

The foundation, or seate, is meant to be the toppe, and highest part therof, which in man, is placed somewhat higher then the body of the fift Vertebre of the brest, yet lyeng not close thereto, but ouer agaynst it.

Besides, this innuolucere, in the progresse or descēse therof, varieth as touchyng situatiō. For in mā, whose force part of the brest nature hath made shorter, is seited so crooked, towardes the left side, & agayne forwardes, as that the poynt after a certaine maner reacheth moze downward, the that part of y<sup>e</sup> brest bone, whereto the vpper part of *Septū transversum* groweth. And agayne so much appertaineth to the left side, as that the right part of his poynt scarce attaineth to the middell of the brest. Also to the force partes the poynt so procedeth, as that it may touch the left side of the brest bone, and Cartilages coarticulated or knit thereto.

It consisteth of Membranous substance, and with the other Membrans therfore numbred amongst the similar partes of the body. For it is enterwoven with no Fibres, but is a simple Membran, every where thicke, very hard, and constitutynge a concavities, wherein the hart may both vse his dilatation, and constriction safely. For the hart, in it selfe, containeth no portion growyng thereto, but is disaunt every where equally from it.

This cavities is altogether smooth, wette with a certaine thinne humoz, and destitute of all fatnes. And so is the outer face of this innuolucere, although Aristotle farre otherwise supposed, affirmynge the innuolucere of the hart to be fat, deluded peradventure with the intersepiant Membrans, which, growyng to this innuolucere, are very fat, especially in man. But the exterior face of this innuolucere, for y<sup>e</sup> Fibrous knittynge, as Membrans growyng together, is rough. To the anterior part of the innuolucere of the hart, whereto those Membrans are not knit, Membranous Fibres, fulfillynge, or suppleng the come of these Membrans, do grow. But to the whole posterior part, the intersepiant Membrans are freely growyng.

All the poynt, and egregious portion of the right side of this innuolucere, groweth very strongly, and in most ample space, to the sinewy circle of *Septū transversum*: whiche thyng in dede is peculiar to man, since in Dogges, Apes, and Swine it is much disaunt from the midzeif. Also, in man onely, the anterior part of the poynt cleaueth to *Pleura*, with Fibrous knittynge, in that part (I meane on the left side) where the Cartilages of the vj. and vij. ribbes are bound unto the brest. But that knittynge of the innuolucere is brought to passe among the Membrans that deuide the brest in the middell for no where the innuolucere of the hart

hart exceedeth the middell of them, nether in any part toucheth the lunges, but by their interuenture.

Howeuer there are no arteries disperfed in this innuolucere, neither veines, but lesse it be some small ones, springyng from those whiche are deriued to the intersepiant Membrans, as others to *Omentum*. For when it transmitteth *Vena cava*, it bozoweth of it scarce any thing: but where it groweth to the midzeif, it chalenyng obscure, procedyng from those, out of which there current nerues do brach. Thus this Membranous innuolucere, beyng as a fine bore or case unto the hart, susteineth the same, by the ayde and benefite of the intersepiant Membrans.

In the space or distaunce contained betwene this innuolucere *Pericardion*, and the hart, a certaine watric humoz is contained, lest the hart by perpetuall moeynges might be dreyed: whiche although *Mathens Curtius* doubted to be true, the truth notwithstanding, both in dead, and liuing bodies both testifie it selfe.

The hart, within this innuolucere closed, beyng the fountaine of vitall heate, and perfectoz of vitall spirites, after they are laboured in the lunges, as befoze is touched, is also the originall rote of all Arteries, but not of Serues, neither Veynes, as fondly some haue fabled.

The figure of the hart is not much unlike the pine nutte (but somewhat depressed) that is to say, haupng a broader foundation, but endyng by litle and litle, at a poynt somewhat sharper then the pine nutte, & is much moze long then thicke. All the exterior face therof, from the foundation or seate, to the extreme part of the poynt, is very euen and smooth, growyng to no part at all. Notwithstanding the branches of the coronall Veyne, runnyng from the seate to the poynt of the hart, with the fellowshipp of their Arteries, which swellynge with blood do cause a litle inequality, but not much, because y<sup>e</sup> greatest portio of their bodies, is impressest within the substance of the hart: so likewise doth the fat, wherewith mans hart aboundeth, enduce some inequality: but the foundation of the hart for the goyng forth of the vessels, is every where vnequall. For to the right side therof, the right auricle, together with *Vena cava*, & the arteriall veyne, is committed. But it hath on the left side the left auricle, and besides the veniall arterie, the begynnynge of the great arterie. Of which moze at large hereafter.

The hart, although it was of sapient nature situated in the brest, yet not in the middell of the body, for the centre is onely occupped of the nauell: not in the middell of the brest, as Aristotle supposed and the common people at this day do thinke. For onely the seate of the hart, which, since it is the originall of the vessels, is supposed the most noble part, exactly obtaineth the middell of the right and left side of the brest: both beholdyng the anterior, & posterior partes. For so farre it is disaunt from the brest bone, as it is in space from the bodies of the Vertebres. Of the longitude of the brest, which is constituted of xj. ribbes, it respecteth the body of the fift Vertebre. But in the anterior region of the brest, which is ended by the longitude of the brest Bone, it obtaineth truly the middell, beyng so much remoued from the Cannell bone, as disaunt from that part of the brest bone, whereto the midzeif is inserted. And thus in his seate, this noble part is safely situated, beyng much remoued fro the iniuries which outwardly might happen. From which part, the rest of the body of the hart, by litle and litle, is so reached forth towardes the anterior partes, and into the left side, as that the posterior part of his poynt, bendeth moze to the brest, and forwardes, then the centre or middell of the foundation: and the right part of the poynt beyng moze to the left side, the middell of the same seate, exceedeth the middell of the brest bone, into the left side, and the centre or pich of the poynt respecteth the Cartilages of the vj. or vij. ribbes on the left side, where they are bound unto the brest bone.

Ec. liij.

Fur.

Deyn's and are  
ties to extend.

Name.

The watric hu-  
mor contained in  
pericardium, and  
the vse of it.  
Cecilius. 7.

The hart.

Vesal. lib. 6. cap. 9.  
The figure of the  
hart.

The circumscryp-  
tion of the hart.

Colliad.  
Vesal. lib. 6. cap. 9.  
The situation of  
the hart.

3.  
The substance of  
the hart.  
Col. quique lib. 2.  
de re peramentis.  
Cap. 4.

Fibres.

Col. libid.  
The substance of  
the hart is not  
muscular.

V. Col. libid.  
which are the  
draggon fibres  
of the hart.  
The transuerse.  
The oblique.

The use of the  
flow of the hart.

Ch. v. of the  
fibres.

Corbis motus a na-  
tura.  
Col. lib. 7. of. part.  
Col. libid.  
What is Diastole.  
What is Systole.

5.  
Col. Loc. lat.  
The Coronall  
veyne  
The Coronall Ar-  
tery.

Col. libid.

The use of the  
nerue to the hart.

6.  
The coate next  
the substance of  
the hart.  
The fatne of the  
hart.

Col. libid.  
The use of the  
fatne to the hart.

Furthermore it lyeth so apt for the embracing of the lobes of the lunges, as most readily the vessels might, from the one, to the other be conuayed.

The chief substance of the hart doth consist of flesh not altogether so red as the flesh of the Muscles, but in hardness, thickness, & interweaving of Fibres, much varying from it. For the flesh of the hart is much harder, and thicker, to beare out, iniuries farre more able, (for so it was expedient considering his motion) and finally, with diuers kyndes of most ströng Fibres enbedded: whereas the flesh of Muscles is not so firme, but contented with foure Fibres, that is for the most part one kynde, and those more strewngly set, according to their required actiō, as in the history of Muscles: whence the error of those is detected, who sencer they are, that affirme the hart to be of Muscular substance.

There forties therfore of Fibres are cōteined in y flesh of the hart, that is to say, straight, oblique, and transuerse. The straight we call those, which from the foundation, are caried to the poynt of the hart. Those transuerse, which, in crosse or compassing wise, goe about the hart, and those oblique, that chose their course more slopewise then the others.

The flesh of the hart auayleth to the principall functions therof, which especially consist in the making of vitall spirite, or in making perfect the same, after the labour of the lunges, as *Columbus* assureth vs.

The Fibres serue to another function: for by them, the hart, whilest the creature liueth, is dilated, and contrahed, and somewhiles resteth betwene contractiō and dilation. Moreover they serue to the mouyng of the hart, which is naturall, and nothyng subiect to our will, as thus: the straight for attraction, the transuerse for expulsion, and the oblique for retention. And these motiōs of the hart are called *Diastole*, and *Systole*: and *Diastole*, when the hart in his dilatation receiueth in of spirite, like as *Systole* is, when the hart by contraction putteth forth the same.

The seate of the hart is compassed round about, which the *Veyne* called *Coronalis*, that so the hart might be nourished by his blood, to the which *Veyne* also is ioyned in fellowship, the arterie called *Coronalis*, which is yet to describe, and which sometyne are i. to the end that by meanes and helpe therof, the substance of vitall heat might be quickned. Wherefore (sayth *Columbus*) some man may doubt, yea, & by the premises, frame a sufficient argument to proue, that the vitall spirites are not begottē in the hart, but in the lunges. Albeit he referreth the case to the more sapient Philosophers to discusse. And so it shalbe sufficient, here, truly to describe the partes of the body, how they are, & to what vse created, least I meddle ouer farre in such misteries.

So the seate moreouer of the hart, is offred a litle *perue*, proceeding from the left sinew of the vi. payge from the bzaipne, whereas it constituteth the left recurrent *perue*. For this pearling through the seate of the hart, his inuolucure, and reached forth to the left side and posterior part of the arteriall *Veyne*, crēpeth very obscurely into the foundation of the hart, and that onely for the feeling of annoyances.

The coate that groweth close vnto the substance of the hart, is altogether auerable to that *Pembzan*, whiche so firmly groweth to the bellies of the Muscles, I meane that most thinn *Pembzan*, which from the substance of the Muscles may not be plucked. Upon which coate, in mā chiefly, groweth plenty of hard fat, but that most commonly, about the seate of the hart: though sometyne it be effused euē dolone to the poynt of the hart, by the sides of the *Veynes*, and Arteries sprinkled about the body therof. Which fat was for the continuall mouyng of the hart very necessary. For to that end, we finde fatnes also in very many partes of the body, and chiefly about the eyes, and tēpozall Muscles, least they should be dyed by labour.

Beside

Beside fatnes, the hart hath litle eares or auricles. For so the authors of dissolutions, do call those two Appendaūces, growing to the seate of the hart. They are called by the name of eares, not for their vse, nor any action, but for similitude sake, which they obtaine, in situation, like vnto the proper eares.

The right eare is set to the right side of the seate of the hart, coueryng all the fore part of the infertion of *Vena cava*, after his longitude, and with his poynt be- parting from the body of the *Veyne*, rayseth it selfe vptwardes, somewhat higher then the seate of the hart.

The figure of this auricle is like a poynted steeple pillour or other building, whose broadest part is the bottome, and thēce the nearer to the top, the narrower. For so it beynneth, but at a lōg fashioned foundation, & goeth forth into a sharpe, albeit not very sharpe, nor long. The exterior face of the auricle varieth, according to the fulnes, or emptines therof. For whē in the contraction of the hart, it swelleth, being filled, then it is Gibbous, euery where equall, & as with a watric humoz annoynted. But being fallen, and emptied, appeareth wrinkled, and set with foldes. Sometymes also, though very seldome, it chaunceth, that the outside of the distended auricle appeareth vnequall, but that is thorough fatnes then, that groweth vpo it. The inside or interior *Superfice* of the eare, circumscribing a cauitie, is wholly answerable to the same side of the Ventricle of the hart. For like as that, where the vessels are inserted & educed, is smooth, but ehy where els rough and full of canes: euē so that eare, where it groweth to the infertion of the hollow *Veyne*, is smooth, but in all the other roūme beside, so full of fibrous foloynges, as that it surmounteth the ventricle of the hart, in inequality.

The substance of the auricle is litle, but that very hard and skippy flesh, where in it much differeth from the hart, but in that it containeth the threē forties of Fibres, it is therein answerable to the flesh of the hart.

The setting to of the auricle is much after this sort. The left side of his seate, groweth to the extreme part of the substance of the hart, where the anterior region of the *Orifice* of the hollow *Veyne* consisteth in the right Ventricle of the hart: or more truly, the auricle goeth forth from that same extreme part. But the right side of his seate, groweth to the body of the hollow *Veyne*, after the longitude of his infertion into the hart, and in the anterior part therof, being made, as it were, one body with the *veyne*. The rest of the auricle is frē frō the knitt- yng to of any part, being contained also within the inuolucure of the hart, though with no fibrous knittying committed thereto.

The left auricle of the hart, is in very many poyntes like vnto the right. For it consisteth in the anterior seate of the rising of the veniall arterie according to the longitude therof. And so from his seate also, ceaseth at his poynt, as is sayd of the other. Which poynt being sharper then the poynt of the right auricle, but is reached more toward the left side. Besides, the left in more aged persons, giueth place to halfe the largenes of the right auricle, like as the *Orifice* of the veniall arterie, is much lesse then the *Orifice* of the hollow *Veyne*.

As touching the inside and outside, the auricles are euery where one like an other. Although the exterior *Superfice* of the left, is alway more wrinkled and vnequall. In substance also they are agreeable, but the left is much harder, and in contraction and distention is lesse obedient. And if it be compared to the right auricle, it appeareth feeble and dyed, and on the outside alway, aboundyng more with fat then the right.

In knittying they agree altogether. For as the right groweth to the right side of the hart & *Vena cava*, nigh the infertion therof: so in like sort the left in the right side of his seate groweth to the substance of the hart where the veniall arterie goeth forth: but on the left side to the same body of the veniall arterie,

Id. i.

An

2.  
The substance of the  
hart is not  
muscular.

3.  
The substance of  
the hart is not  
muscular.

Figure.

Substance,  
Fibres.

Situation.

2.  
The description of  
the left eare of  
the hart.

wfe.

In vse notwithstanding they differ, although very little. For when as the hart with great force, doth receive his blood into the right Ventricle from *Vena cava*, and, as it were in snatchyng wise, doth swallow it, the same *Vena cava*, not consisting of any strong or arterious body, should greatly have bene daungered, I meane for breaking, in that strong attraction of the hart: saue onely that therfore nature created the right auricle of the hart, which being obedient to the moving of the hart, and full with blood, should poure forth the same blood which it containeth, into the right ventricle whē the hart is dilated, and that the same should be, after a sort, rowled into that ventricle to dispenche with the force of attraction, and to be to the hart, as a ready hand or storehouse. Answerable to which vse is the cuticular construction of the auricle which is light, and to the suffering of injuries resistaunt. Hollow it is to containe the matter, and construct with Fibres, as a thyng subiect to attraction, retention, and expulsion.

Likewise the left auricle of the hart, growyng to the veniall arterie, beareth altogether the like service vnto it, and to the left ventricle of the hart, as we haue sayd the right eare to be in vse to the right Ventricle. And so much the lesse is the cauitie of the right eare, by how much the Office of the veniall arterie, is narrower then the Office of *Vena cava*. In moving also, ayze is more ready to folow then blood, so that for this occasiō also, the left auricle is made lesse thē the right.

The hart of mā obtaineth within, two notable and large cauities, called of the Latins *Ventriculi* or *Sinus*, sitēd after the sides of the hart, one on the right, the other on the left. Wherof the right excēdeth the other in largenes, and both of them in fourme varie much one from an other.

For the right descendyng more downwardes to the poynt of the hart then the left, hath his cauitie made like the Pome encreasing. As in the right side, anterior, and posterioir part, like the inside of a halfe circle, there answeryng to the exterior *Superficie* which is Gibbous. But on the left side of it, it is Gibbous like the outside of a halfe circle, by meanes of the hedge betwene the Ventricles, which as a thyng halfe round, boucheth into the amplitude of the right Ventricle. And this fourme the right Ventricle of the hart obserueth, from the seate down to the point. No otherwise then as the figure of the hart is made also from his seate narrower.

The left Ventricle also begynneth with a large seate, but by litle and litle becommeth steeper towardes the poynt of the hart, obtaining as touching the whole *Superficie*, a round cauitie like a Pincapple. For the hedge that is betwene the Ventricles of the hart, on the left side, wherewith it maketh the right of the left Ventricle, is hollow contrary to the other side, which boucheth into the right Ventricle, and hath equall thickenes and nature with the substance of the hart, constitutyng the anterior and posterioir partes of the left Ventricle. But the whole substance of the hart, beside of the hedge of the Ventricles, constitutyng the amplitude of the right Ventricle, is very thynne. But that which effourmeth and compasseth about the left Ventricle, surmounteth much in thicknes the substance of the right Ventricle, and is euery where a like thicke, sayng the seate onely, where for the insertion of the vessels, so much substance must needes wāt, as the amplitude of the Offices do occupy space.

The *Superficie* or inside of both the Ventricles is very vnequall, and beset as it were with many caues, deeply impressed into the fleshy substance. Neither do these consist onely in the sides where the right ventricle respecteth the left, but round about, throughout the whole *Superficie* of the ventricle: and that not onely in new dissected bodies, but perpetually apparant as oft as you lust to behold the hart: neither at any tyme not appearyng in a dyed hart besides this inequality, which in the left ventricle is something greater: both of them haue inwardly certain

taine fleshy explantations or Processes, which are round and slender, and cease into Membranous Fibres, continuall or ioyned to the lower seate of the Membrans in their borders reposed. These Processes are chiefly discerned fleshy at the poynt, or lower part of the Ventricles, which make to the strength of the Fibres, which they conteyne.

That thzough the hedge situated betwene these two Ventricles, blood should passe, as it were by refudation, from the right into the left Ventricle, almost all Anathomistes hetherto haue affirmed. And that the same in passage also should be made thinner for the more easie generation of vitall spirites. But very wyde they wander, sayth *Collumbus*. For the blood thzough the arteriall Veyne is carried to the lunges, whence, being attenuated, it is carried by the veniall arterie into the left Ventricle of the hart together with ayze: which no man before his tyme noted, or at least haue left extant.

Moreover about the seate or foundation of the hart, foure vessels are apparant: two to the right Ventricle, and two to the left: in the right, the hollow Veyne, and arteriall Veyne: but in the left, the great arterie *Aorta*, and the veniall arterie.

Notwithstanding, esteeme not (as many suppose) that the hollow veyne doth spring from thence: for it goeth not into the hart, as falsely they imagine, but being deuided or cleft a sunder in that place, cleaueth onely to the Office of the right Ventricle.

The arteriall veyne neither springeth from the hart, but from the liuer. For note, if we behold the same whilest the infant as yet is shrouded within the mothers wombe, we shall finde the hollow veyne to be continuall with the arteriall Veyne. In somuch therfore as it is a Veyne, it fetcheth the begynnyng from the liuer, but as touchyng that it is arteriall, frō the hart. For of all arteries the hart is the fountaine. It goeth to the lunges to carie blood for the nourishment of the instrument, and to the end, that the same may be altered for the hart. Sufficient great is this arteriall Veyne, yea much greater then was needefull, if the blood had bene onely to be carried to the lunges, in so small space about the hart. It is deuided into two trunks or notable branches, both to the right, and to the left lunges: thence forth into sundry branches, as before is sayd in the lunges.

The arterie named *Aorta*, which of all other arteries is the mother, springeth from the left Ventricle of the hart, and riseth upward.

But before we prosecute the description of this arterie, it seemeth mete to speake of the veniall arterie, set to the left ventricle of the hart it is called an arterie, in that it serueth to spirites and arteriall blood: but a veyne, because it hath the body or substance of a veyne. It is a vessel sufficient large, which also thzough the lunges is deuided like the arteriall veyne.

The opinion of other Anathomistes is, that the vse of these diuisions of this vessel into the lunges, is to cary vnto the lunges the altered ayze, which are as a fan wynde to the hart, to cole the same: they supposing also that then the lunges do receiue certaine I know not what fumes frō the left ventricle. And this inuention doth meruailously delight them: because they imagine that in the hart surely the like is accustomed to be done as in chimnepes: as though in the hart were greene stikes, which whilest they burne, do make a smoke or fume. Thus much *Collumbus* writeth accordyng to the sentence of other Anathomistes. But he himselfe iudgeth cleane an other way: as thus, that this veniall arterie is made to cary from the lunges, blood mixt with ayze, into the left Ventricle of the hart. Which thyng (sayth he) is as true, as that which is most true: not onely being apparant to euery inspection of dissected bodies, but manifest also in quicke dissections of creatures, how full of blood this Veyne is alway founde: which could

Col. Loc. cit.

Vessels of the hart.

Id. ij.

not

not be so, if it had bene made onely for ayre and vapours.

It is to be noted that in the Offices of the iij. vessels, at the seate of the hart, xi. Membranes do stand, called *Trifolice* or iij. edged that is to say iij. to *Vena cava*, iij. to the arteriall beyne, iij. to the arterie *Aorta*, & ij. to the veniall arterie: which are not all in figure alike. For those which are put to the hollow beyne, & veniall arterie, are diuerse in forme from the Membranes of the great arterie, and arteriall beyne. For the Membranes of these, are like iij. of those letters which the Latins call C: but the others are like arrowes. The vse of these is meruillous: and by their meanes, we learne and perceiue many thynges, that appertaine to the knowledge of the functions both of the hart and lunges. Know therfore, that as they are in figure diuers, so their vtilitie not all alike. The wickettes therfore (for so they may not much vnaptly be termed) of the hollow beyne and veniall arterie, are sited from within forth, as seruyng to the emission of blood: but the wickettes of the other ij. vessels, contrariwise, from without forth, or inward, that so they might seeme vnto vs to be made, for the containing of included blood. This also note, that those litle wickettes, which from within forth are opened, abound here and there with certaine filmentes or thredes, dispersed through the ventricles, made so to hold and strengthen them. By which filmentes peradventure Aristotle was deluded, supposing them to be sperues: so therfore he assigned the hart to be the roote of sperues, and consequently of feyng and mouyng. But to returne to the foure vessels: two of them are made to carie into the hart, whilest the hart is dilated: but the other ij. to beare forth in the time of constriction.

When the hart therfore is dilated, it receiveth blood from the hollow Veyne into the right ventricle, as also from the veniall arterie, prepared blood and spirite into the left ventricle. Therfore those Membranes lye downe and yeld to goyng in. For whilest the hart is contracted, these are shut: lest any thyng they haue receiued, should returne or go backe agayne the same wayes: and at the same instant the Membranes, of the great arterie, and arteriall beyne are opened, and giue way to the goyng forth of the aerie blood, which throughout the whole body is dispersed, and to the naturall blood caried forth to the lunges.

The matter therfore is alway so, that when the hart is dilated, the Membranes first mentioned, are opened and the rest shut. So that you shall finde the blood which is now gone into the right ventricle, not able any moze to go backe agayne into the hollow beyne. By which sense we gather that the hart by no meanes is that member wherein blood is engendred, as Aristotle sayth, when as the blood is from *Vena cava* distributed,

This mozeouer know for a suretie, that in the hart of man is no bone to be found, although in Dren, Horses, and such great creatures it may be shewed, but in man no such thyng, except it chauce, that in very aged persons the like be invented: as in the History of bones I haue protested my selfe once to haue found. Onely a Cartilaginous substance at the roote of the great arterie, towarde the arteriall beyne is sene, whiche a Bone in no wise may be called, although Galen him selfe would haue it so: whose sentence partly I haue set forth in the place afoze cited.

Suppose this assertio most approued in Anathomie, that all arteries proceede from the hart, even as all Veynes from the liuer, & all sperues from the Brayne.

From the left Ventricle of the hart therfore, springeth that arterie named *Aorta*, of all other arteries in the body the mother. In quantitie it is sufficient large, and in substance thicke and white. The cause of the thickness is first, lest the blood with filled spirite should easely banishe and waite, and secondly lest it in mouyng should be broken. For the Arterie moueth continually, yet not by it selfe but through spirites.

After

After that *Aorta* is gone forth from the hart, immediately it bringeth forth a small arterie called the coronall, because it compasseth about the seate of the hart, to quicken and refresh his substance, in which it is diuersly disseminated: albeit you haue to note by the way that in some bodies this coronall arterie is not onely one, but ij. and so *Vesalius* describeth it: but further ascendyng, it is deuided into ij. trunkes or stockes, one greater, the other lesser: the greater descendeth, the lesser ascendeth, that trunk is made the greater which I say both descend, for that the great portion of the body was to be renewed therewith.

The trunk ascending putteth forth an arterie from the left side, which is called the *Axillaris arteria*, which stretcheth forth obliquely towarde the armehole, and sendeth bzaunches to the superiour ribbes, and goyng forth to the arme choiceth his iourney after the inside, to mate himselfe with the inner *Basilica*, but sendyng a bzaunche vpwordes, commaundeth others to all those Muscles, which are about the shoulder, the scaple bone, and his caviitie, not saylyng the anteriour partes of the brest, nor the Glandules vnder the armehole.

But the trunk of *Arteria axillaris* descendeth straight through the inner region of the shoulder, downe to the boughte of the cubite: and before it passe this part, it giueth out a litle Arterie to accompany the fourth sperue of the arme, whiche Arterie is among the Muscles distributed, that serue to extend the cubite: but so soone as it hath passed the bought of the cubite, it is deuided into two, sometyme into thre arteries, yet first it leuyeth litle arteries to those Muscles that are in the shoulder and cubite, and one bzaunche goeth neare to that Ligament that is set betwene *Cubitus* and *Radius*, and being gone forth marcheth to the externe Muscles. The remnant foloweth the longitude of the cubite: which after it hath slowd beyond vnder the inner transuerse Ligament of the wrist, in the palme of the hand, it is diuers wayes deuided, and to the extremities of the fingers deuided: but another bzaunche tendeth towarde *Radius* after his condyng: and so soone as it is past the middest of the cubite, it ariseth betwene two Muscles: and goeth vnder the skinne by the inner part of *Radius*. This is that bzaunche, whose mouyng Whistions are accustomed to feele, when they lay hold of the wrist, to take counsell at the pulse.

By the way notwithstanding I with the this to note, that in some persons this bzaunche is diuersly placed, so that to be the same, whiche hetherto we haue spoken of, thou mayest take occasion to doubt, in that it is sometyme caried on the outside. So that what Whistion soeuer, vnerpert in Anathomie, shall in the accustomed place (chiefly in a sicke body) onely seeke for the pulse, and can not finde it, he will iudge vntruly death to be neare that person, and so prognosticate falsely.

Albeit no man may deny, but that very seldome it is otherwise situated, for in bade for the most part, it doth occupy the inside. This mozeouer so soone as it departeth from the wrist, it proceedeth through the outside, to the extremities of the fingers. An other bzaunche neare to the Ligament is caried.

This trunk after wardes ascendyng, this *Axillaris arteria* beyng now dispersed, it is cut into ij. arteries called *Carotidas*, or *Seperarias*, which through the laterall partes of the necke, are straight caried to the seate of the skull, cleauyng to *Aspera arteria*, & fixed to the inner veynes called *Iugulares*. But before they enter into the Skull, they send ij. arteries to the face, & beyng deuided vnder the neither iaw, they impart of the smaller sort, to the Muscles of the necke, of the head, of *Larynx*, of *Hyoides*, and of the tounge. But the two bzaunches (which are the greater) caried to the tounge, are caried throughout his longitude to the extremitie thereof, which iourney beyng atchieued, they ascend vnder the eare, and both before & beside the same, are to the temporall Muscles eleuated, so then beyng to the forehead, to the skinn of the head, and to the Muscles of the face distributed.

Id. iij.

The

There are both  
Interne & Externa  
Iugulares.

The other arme of bowe therof, which to be caried backwardes we have affirmed, is bestowed vpon those ij. Muscles, which (according to *Columbus* inuention) are placed in the posteriour part of the head. So is it caried also to the skinnie, and Muscles of the head. From the same place, and somewhat higher also two arteries fetch their begynninyng, entryng into the nether iawbe, vnder the eare, in at the hole there (if you behold diligently) sited, after the longitude of the iawbe: with whiche Arteries a Veyne and Nerue are ioyned in societie: but then they are disperied to all the routes of the nether teeth: a part notwithstanding goeth forth through the hole in the chinne, and marcheth through the lippe. This Arterie *Vesalius* forgot, in somuch that he hath made no mention at all therof.

But before we fall to the description of those arteries which are contained in the Scull, certain others are first to be described, of which a part also is taken from the Scull.

It is to be noted therfore, that y<sup>e</sup> right *Arteria axillaris* doth spring fro a place lesse exalted then the left. Whereouer it marcheth not in oblique order as it doth. But the begynninyng of it is fro the right arterie *Soporaria*, in the region of the Canell bone it goeth straight through the armehole vnder the Canell Bone: to the right arme: where it is deuied & marcheth forward like as doth the left. But from the anteriour part, whence these *Soporaria*, & *Axillaris* arteries do spring, y<sup>e</sup> arteries do grow tending downwardes, & send their bzaunches to the superiour spaces of the ribbes, & to the Vertebres, of which two arteries, *Vesalius* was ignorant: also other ij. small arteries do arise, which vnder Sternon are conuerted, & descend, associating those two veynes, which tended to the pappes, & to the bowders of the straight Muscles. After their manner therfore are deuied.

Almost in the same region, but backwardes, towardes the bodies of the Vertebres, you shall note ij. other arteries, which being caried through y<sup>e</sup> transuerse Processes of the Vertebres of the neckes (soz to that end nature left them perforated) as also through those holes, out of which the sinewes do procede, do commaunde their bzaunches to the Spinall marey and Vertebres, & to those Muscles, that side wayes do serue to bowe the necke: albeit that in some persons these ij. arteries are not from *Soporaria*, as in the most, but often from the arteries *Axillares*, produced. These arteries, which thus we substitute to animall contemplation, besetwene the head and first Vertebre, do make ingresse into the posteriour part of the Scull: that is to wit, betwene the same Vertebre and the Spinall marey: first ministeryng vnto the care or laberinth of the eare y<sup>e</sup> arteries, which in their ingresse do mingle together. But in such order the right is united to the left, as that of both, one for the length of halfe a finger, is made: Into y<sup>e</sup>. it is afterward deuied: then agayne into many others, and first they reach to *Dura* and *Tennis mening*, and then to *Cerebellum*. By these the begynninyng of the Spinall marey, *Cerebellum*, and part likewise of the bzaune, are reuiued and quickned: and if nature had not begotten, these (sayth *Columbus*) the posteriour partes of the Scull had wanted arteries.

These ij. arteries, which through the transuerse Processes of the Vertebres do arise vpyward, betwene the first Vertebre, & the bone of the hinder part of the head, enter into the inner region of the Scull betwene the same Vertebre, & the spinall marey. But after they are entred into the cauitie of the Scull by the length of halfe a finger, they are ioyned together, and of ij. made one onely arterie.

Neuerthelesse they are agayne forthwith deuied, and that into a right and a left, from which, arteries are to the ij. Membzans of the bzaune, and to *Cerebellum* suborned. And further, through the substance of these partes, in the vpper part, through the halfe space of the Scull, most large is the distribution of these arteries. The rest of the Scull is reuiued by the ramification of the y<sup>e</sup> arteries *Caratides*,

*Caratides*, or *Soporaria*, as shortly shalbe sayd. Which before they penetrate into the Scull, imparte of their power by little Arteries into the laberinth of the eare. But so sone as this trunk of the Arterie is entred into the Scull, as is before sayd, it dispatcheth forth bzaunches to the Spinall marey, to the hard and thynne Membzan, to the bzaune, and *Cerebellum*.

Of these y<sup>e</sup> arteries the true distribution, no man hath knowne before *Columbus*, nether did *Vesalius* inuent it, who, whilest he was practised in the description of the Arteries ascendyng through the transuerse Processes of the Vertebres, was contented to affirme, that they entryng into the Scull, do tend through that cauitie of *Dura mater*, into which the Veynes *Inguiales* do enter, but this rather he supposed to see with his eyes. Wherefore (sayth he) no meruaile, if so much he deuied the description of auncient Anatomistes, as touchyng *Recre mirabile*: since rather from these Arteries, of whiche he was ignorant, then from the Arterie *Caratides*, the meruaillous net is effourmed: although neither to Galen these two Arteries haue bene knowne: therfore he sayth Veynes are caried through the posteriour partes of the head, and Arteries through the Anteriour.

But these two Arteries whiche we haue described, are vnder the Spinall marey exalted vpywardes, and besides those manifold bzaunches, whiche are sprinkled throughout the thynne Membzan, they passe into the substance of the bzaune, in that place, whiche is called *Canarium*, or *Glandula Pinealis*, in the extremitie of the superiour Ventricle, and there byingeth to passe a large and notable plicature, or weauyng: which (after *Columbus* opinion) may wortheily, for the marueilous workemanship therof, be called the marueilous nette, whiche is in the posteriour part fastened to *Torcular*. Into this plicature so notable and worthy admiration, are imitted two Arteries named *Caratides*, as in their place shall not be omitted. Therfore of foure Arteries this marueilous nette is made, most notable to eche studious Anatomist, both for the dignitie and newnes of the thyng, which before *Columbus* was neuer taught or noted.

The Arteries *Caratides*, so sone as they are come to the seate of the Scull, they seeme to enter the hole, forth of whiche did passe the y<sup>e</sup>. payre of sinewes, and whiche doth take in charge the inner Veynes *Inguiales*: albeit they arise not vp, nor here do bying forth two Arteries, as *Vesalius* affirmeth: who also would haue them to enter into the cauities of the hard Membzan together with the Veynes *Inguiales*. But then thou wilt say peraduenture, what do these Arteries vnder the seate of the Scull? They are conuerted to the Anteriour part, and passe through a hole, which lurketh in the tepozall bone neare that, through whiche the first coniugation of sinewes descendeth, and they enter among the inner *Inguiales*: but before they be receiued of the inner part of the Scull, they deliuer forth two Arteries, whose bzaunches are diuers, to wit, to the palate, to the inside of the nose, to the vpper teeth: others enter into the Scull by those holes there sited, and lyke a tree through the sides of the hard Membzan, together with those Veynes therein conspicuous, are explicated, and therfore is *Sincipit* in that place cryeaud.

But after that these Arteries haue effused forth these bzaunches to the palate, & teeth as is sayd, they rise vp into the Scull through that hole, which is sited betwene *Sphenoides* & the tempozal bone, in which place a part of the thyrd payre of sinewes descendeth: although *Vesalius* for the same doth reprehend Galen. But so sone as they are passed the seate or sell of *Sphenoides*, they minister ij. Arteries to the eyes a long by the optike sinewes, to shew lyfe vnto the eyes, and not onely lyfe vnto the eyes, but also to the Muscles of the eyes, and to those by which the iawbe is opened, & meane the vpper iawbe: wherefore you shall finde the

Id. iiii.

diui.

Col. lib. 7.

The beginning at the left is higher then the right.

Col. lib. 1.

Col. Loc. cit.

Pete. mar. lib. 1.

The glandule in the bzaune ben- recth the shape of pens.

Torcular is the fourth cauitie of Dura mater quas: dupliplied be- tweene Cerebrum and Cerebellum.

Col. Loc. cit.



diuisions of these large and many.

That which remaineth of these Arteries *Cavartides*, ascendeth about the aforesayd sell coherent with the thinn Membran, and after the callous body toward the posterior partes, and diuers wayes is sprinkled through the thinn Membran, about, within, and to the sides. Also some of their branches are deduced from the thinn to the hard Membran, and others from the thinn Membran to the substance of the braine.

After so many distributions of the *Soporiferous* Arteries about the sell of the Cuneall bone, they underlay the upper Ventracles of the braine, immediately after they haue perforated the thinn Membran, the which Ventracles are anfractuons or full of foldes: and whereas at first they seemed but two, they are seuered into very small ones and those innumerable. There therfore you shall behold a most pleasaunt nette contered and woven together of Arteries: the which Arteries haue their Veynes to them ioyned in fellowshipp, and in their endes lyeth the Pineall Glandule. These hath Galen described for the nettyke folowyng, as though it might represent the Secundine.

*Collumbus* notwithstanding boldly affirmeth this (if it be any where at all) to be the marueilous nette: for no where (sayth he) shall you finde such foldes, through foldes, and interweauynges of the least, and innumerable Arteries, els. But Galen did describe the marueilous nette whereof he maketh mention, to be aboue *Sphenoides*, where that Glandule, which receiueth euery excrement begotten in the braine, being to that office by Nature dedicated, is resident. But whosoever shall seeke the same where Galen hath described it, he shall be frustrate of his purpose. For nothing els shall he finde there, but certayne litle Arteries, ministeryng lyfe to these partes, and to the bone *Sphenoides*. The same Arteries, which thus constitute the marueilous nette, do send their power through the substance of the braine: which thyng of no other Anatomist, save onely of *Collumbus*, hath bene written.

And this is the end of the description of the superiour trunk of the great Arterie, without you make account of those Arteries to be described, which flow forth to the right superiour ribbes. This by the way is worthy to be noted, that not one Arterie tendeth to the lunges, whereby they might receiue vitall spirites from the hart. And this is a sentence most approued in Anatomie, that (exceptyng the lunges onely) all other partes of mans body are enuowed with beating Arteries. By which reason, *Collumbus* protesteth sufficient authoritie to what seueral disputer soener, shall goe about to proue, that in the hart it selfe are not begotten the vitall spirites. But of this matter is other where sayd.

The greater trunk of the great Arterie called (as we haue often sayd) *Aorta*, tending downwardes, declineth towardes the left side, and is to the body of the Vertebres adherent, which to the superiour trunk is not incident. For that, no otherwise then *Vena cava*, is distant from the Vertebres. This inferiour trunk therfore, whilst it descendeth, out of his hynder part profereth Arteries to the spaces of the ribbes: and these agayne charge others to the Spinall marey, to the Vertebres, and to the Muscles, in the posterior part of the best sited. But where it cometh downe to *Septum transversum*, bringyng forth two a lyke Arteries, which are into the same distributed, it passeth under the same, and still cleauyng to the body of the Vertebres, marcheth downe to the last Vertebre saue one of the loynes. But so soon as it hath passed the midriff, it produceth an Arterie to the liuer, in place whence *Hepatica* went forth, as we haue sayd: being there distributed. An other spedyeth to the vesicle of choler, an other to the splene, an other to the

The Arteries called Cavartides, ascendeth about the thinn Membran to the bone Sphenoides, above mentioned.

Glandule Pituita, called also Secundine.

Ventricle and Omentum: other litle branches to the Glandulous body *Pancreas*, and others also to the intestine *Colon*. Under this an other appeareth, whereof are very many and large diuisions, both through *Mesenterium*, and to the small guttes: being perpetuall mates to many of the Meseraicall veynes.

Whereouer a litle lower it begetteth two Arteries, and those very notable, called the Emulgent Arteries, which enter into the kidneys. Under the Emulgent Veynes, a litle more bendyng downe, it produceth the two seminall Arteries, which haue their begynnynge from the body of the great Arterie, but not from the left Emulgent (except in very fewe) as to Galen it seemed. These descendyng, are folded together with the seminall Veynes downe to the Testicles, both in man, and young mayde, and in women to the body of the matrice, yea to the inner part of the matrice: and from these the umbellicall Arteries of the infant, take their begynnynge.

Under these seminall Arteries, in the middest of the trunk emerge an other Arterie, which is carped to the *Mesenterium* of the straight gutte, and to part of the intestine *Colon*, after the left side of *Ileon*. But the Arteries of the straight gutte, downe to the extreme part of the fundament, together with the Meseraicall Veynes of *Vena porta*, do descend, wherefore there are made both Veynes & Arteries called *Hemorroidales*: in the posterior part out of the same Arterie under the midriff, Arteries make egress to the Vertebres, to the Spinall marey, to the Muscles of the backe, and to the Muscles of the bellye.

But so soon as it is come to the last Vertebre of the loynes but one, and in some bodies to the last of all, it is first decuded into two and those great branches, which wisite the right and the left side, but surmountyng the hollow Veyne in the region of *Os sacrum*. These two branches are subdecuded, and descendyng more, are ramified to the sides of the bleedar, to the necks of the matrice, and to the Muscles resident in the concavities of Abdomen. Two others likewise passe through the holes sited in *Os pubis* and *Coxendix*: from whence holes, so soon as these Arteries are gone forth of Abdomen, they are sent to the two bodies of *Penis*, from the toppe to the lowest part, and then do they passe in branches: they being those Arteries, by which erection of the yerd is made: which thyng neither hath any man noted vnto vs but *Collumbus*. The remnant of these Arteries, is dispersed through those Muscles, which are put in the inside of the thighe, but they passe not the knee.

From those Arteries which the bleedar receiveth, others also are purchased, which being brought to the inner part of *Os sacrum*, through whose holes they tend, both to the same, and to the Spinall marey: but without, to the Muscles seruyng the thighe. Lyke as also from the great diuision of the Arterie, some issue forth, which with vitall blood, do nourishe the Muscles of the thighe, which are within the belly situated. But of those Arteries which after *Os sacrum*, and *Cocix* do descend, some together with certayne Veynes of *Vena cava*, do flowe to the Muscles called *Sphincter*: the which Arteries, may also be called *Hemorroidales*.

Whereouer out of the great diuision of the great Arterie, two other Arteries spring, which are reflected upwardes, and passing through *Peritoneum*, do ascend under the straight Muscles about the nauell: and in many branches are ended among the Muscles of Abdomen.

In this diuision two Arteries, called *Umbelicales*, are set downe, which are the first Arteries that in the infant are begotten. For after that they make appearance from the Panell: they marche through *Peritoneum*, in what place it is double, vnto the sides of the bleedar, and doe begette these Arteries, of which somewhat before is sayd. But after the begynnynge of the Umbellicall

Arteries.

Arteries.

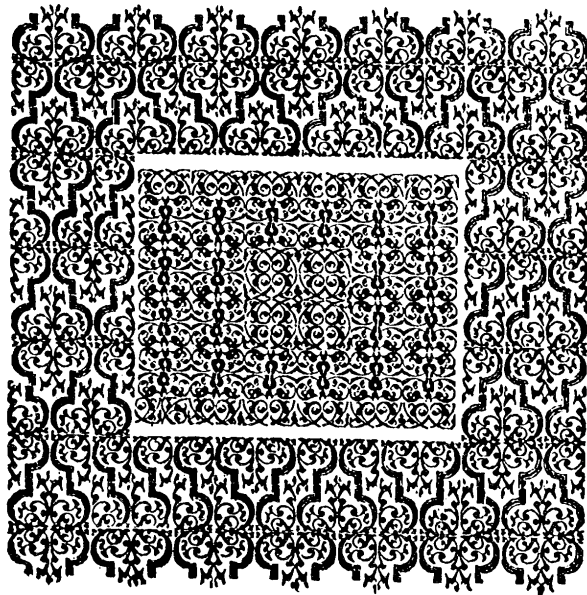
## The seventh Booke of the history of Man.

Arteries, the hart it selfe is begotten : but to returne agayne to the Vmbeli- call Arteries, for of any such partes I determine not further to speake. These, after our bodies are brought to light, are dayed vp, and vsurpe the office of two Ligamentes.

But furthermore the two armes of the great trunk, whiche are caried downe into the legges, passe vnder the fift Muscle of the loynes bowyng the thigh, and goyng forth towarde the Abdomen about *O. Ilium*, and *Pubis*, are loyned in fellowship with the inner veynes of this place, whiche marche among the Muscles. And like as those veynes are deuided: so in lyke sorte we see these Arteries to all the Muscles of the legges, foote, toes, and their extremities, disparcled. Finally, they commend their force by braunches, to the Glan- dules of the flanke, to the purse of the Testicles, and vnder the skynne to the yard.

Now diligent Reader note, that not the Bones them selues are destitute of Arteries, least so they should lacke vitall warmth also: without which, no part in the body lyueth.

¶ Of



## Of the History of Man, the viij. Booke, of the brayne, and Instrumentes seruyng to the Animall function.

98.



Others to the explication of the whole History of Ma-  
thematic, there yet wanteth the fountaine of senses,  
and voluntary mouyng, & seate of the principall part  
of lyfe, by whose benefite we imagine, reason, and  
commit to memory: this present booke, being conse-  
crated to that end, shal entreate of the brayne and his  
vniuersall partes, with the instrumentes of sense.

Like as therefore the substance of the hart is en-  
dued with vitall force, and the proper flesh of the liuer  
with the naturall facultie of life: moreover as the li-  
uer maketh the thicker blood, and that which is caliginous, naturall spirite, at  
least if there be any, and the hart doth confect & mixe with vitall spirite the blood  
runnyng throughout the body: And like as the bowels, through the conduites to  
them dedicated, do berue their matters to the relief of all the partes of the body;  
so also the brayne obtainyng fit matter to his office, by instrumentes in proper  
seates, and fitly ministring to his function, doth beget the Animall spirite being  
farre the thinnest and most excellent, which partly it vseth to the deuine function  
of the principall part of life: distributyng part to the instrumentes of feeling and  
mouyng continually by the sperues, neuer leauyng the destitute of spirite, which  
of the action of those instrumentes, is supposed chief author. No lesse the liuer, &  
hart, doe fulcrate no partes in the body (so long as man is in health) of those mat-  
ters due from them, although not alway in like sorte and qualitie.

The sperues therefore (whose originall to depend vpon the brayne we shal  
shortly declare) owe thereto like seruice as the great Arterie to the hartes,  
and the hollow veyne to the liuer.

For in lyke sort they deduce the prepared spirite from the brayne, to those in-  
strumentes, to which it is continually owyng by natures comminidement, be-  
yng therfore rightly indged the diligent messengers and garders of the brayne.  
Which as it is the most excellent of all the partes and members in man, so is it  
most safely enclosed, & stately constituted, hauyng the supremacye of all the mem-  
bers of the body.

And although Aristotle imagined, not that to be containd in the brayne and  
his facultie as is in deede, and therefore rashly assigned the constitution therof to  
the colyng of the hart, and that the hart should be the author of blood and sense,  
yet it is most certainly otherwise, and his opinion therein easily refelld. For as  
in the hart the spirite is made vitall, and in the liuer naturall blood is forged to  
the whole body: so in the brayne is created animall pover, the most noble and  
princely pover in the whole body, as it is a part most excellent of all others.

What forer therefore some haue inserted to the contrary; *Reusius Columbus*  
by three notable reasons prooeth it chief and supreme of all other member partes  
and offices in the body.

First is, in consideration of the noblenes of the brayne his situation, which  
apertly sheweth the principallitie therof above all other members, for as much as  
it possesse the highest part of the body, and strongest tower from all iniuries.

The second is the figure thereof, which is round, and partly long; but more  
rounde then long: the which figure is rarely made no where of Nature the  
noble Architect.

The third reason that moueth vnto thereto, is to behold the strong muni-  
mentes

Ge. ij.

Veni. lib. 7. cap. 1.

Witall spirite.

Naturall.

Animall spirite.

Use of the Animall  
spirite.

The Arteries are  
the messengers of  
the brayne.

The principallitie of  
the brayne.

Aristotle in caros.  
The brayne was  
not made to the  
cooling of the  
hart.

The principallitie of  
the Animall spirite.

Col. lib. 8. cap. 1.

The first reason  
of the principallitie  
of the brayne.

The second reason.

The third reason.

the fourth cause  
of Dura minor  
doubled.

The leading of  
the veynes from  
the plexus.

Vesal. lib. 7. cap. 1.  
How Dura mater  
is tyed to the  
brazne.

How Dura mater  
hypoeth the  
brazne.

The use of the Fi-  
bres sent through  
the leames.

How pericranium  
is begotten.

Pericranium to the  
skull.

Col. Loc. Cit.  
Where is Pia  
mater.

Chorion.  
Secundina.  
How here lyeth the  
substance of the  
brazne.

The substance  
of the brazne and  
marrey is not as  
like.

The figure of  
the brazne Pia ma-  
ter taken away.

The reason of the  
circumvolutions  
and turnings  
in the brazne.

The brazne hath  
not that figure  
for vnderstanding  
saie as some doe  
say.

Columb. alloweth  
not this imbu-  
ment of Vesalius  
but affirmeth  
that by veynes  
that penetrate &  
substance of the  
brazne it is nour-  
ished as a little  
before is sayd.

stance of the brazne, and through the thinn Membran where with *Cerebellum* is inuolued, they shew them selues mates to the netlike infolder.

And albeit we haue sayd, that lyke as *Pericranium* is an ample matter conereth the hart, therby to yeld him large scoape, for continuall pulsation: so this thicke Membran to couer the brazne aptly as was conuenient for *Diastrale* and *Sistole*. Yet not so disscuered from the brazne, as the hart from *Pericardion*. whiche are not bound together at all with veynes and arteries.

But *Dura Mater* is tyed almost euery where, to the Pannicle that lappeth the substance of the brazne, and that to no small end and vtilitie. For the braznes deriued fro the thyrd cautie of the hard Membran, with an innumerable fort on both sides; vnto the seate of substance of the thinn Membran next vnto it, do sustaine very fitly the brazne suspended, so that it can not fall downe, to comprasse the Ventricles; so that by this meanes, the hard Membran is both to the brazne an inuolment, as also an apt proppre to support and hold by the same.

To which purpose likewise, are maruelously assistaunt the Fibres that craepe forth at the Sutures from the hard Membran, and fastenynge it agayne, and in like manner, to the Skull, as the thinn Membran to it with veynes and arteries: so that the brazne thus secondly vpholde, the waight thereof is excellently preuented, to force it to much downwardes.

Furthermore, consider that nature hath not onely sent these Fibres through the Sutures in reflected maner, as the Smith that turneth agayne y<sup>e</sup> point of the nagle, but they are also encreased about the Skull with a maruelous dilatation, so that all mixynge together in one, do at once degenerate into a thinn Pannicle of Membran, which, because it couereth the Skull, the Grecians haue nominated *περικρανιον*.ouertherlesse, this is not the immediate or sole coueryng to the Skull. For vnder it consisteth yet an other thinn Membran, which is most common also to all other Bones in the body, which be wyappyng them, is therfore called by proper appellation of the Grekes *περιosteον*.

At to retorne agayne to the inward Membrans of the brazne, and those wherof we haue not as yet spoken:

Vnder *Dura Mater*, which I haue sufficiently done my part to shewe, lyeth *Pia Mater*, called also *Tennis memrix*, with which indument the brazne and *Cerebellum* are nearely clad, that is close to the substance of them, it beyng of some called *Chorion*; that is to saye *Secundina*. And this thinn Membran is copiously stowed with veynes, and arteries. Vnto vnder it lyeth, the white substance of the brazne, which is soft and marey lyke, although not so, but differeth from the substance of the marey that is found in the cauities of bones not a little.

Now to come to the figure and fashion of the substance of the brazne, *Pia Mater* beyng taken away; it is very like vnto the folde of the small entrails when *Omentum* is lifted vp; that is, for the likeness of the thyng, in that the brazne, like to the guttes, seemeth to shew many infoldes and turnynges. Of whiche circumvolutions if any man enquire, the opinion of *Columbus*, is thus; that it is so made, both for the lightnes thereof; as also by the same wyndyng folde that the brazne might more easely moue in *Diastrale*, and *Sistole*.

Notwithstanding they are not wantyng that haue sayd the brazne was made so for the cause of vnderstandyng: whiche if it were so, Asses and other beastes should be reasonable creatures as is man, since they want not the lyke shape of the brazne.

But *Vesalius Lib. 7. Cap. 4.* auoyding that error, and sitting forth a more fully reason of truth, thinketh that Nature rather ordayned such folde in the brazne as a meanes of nourishment to the substance thereof: for neither is it so firme in any place, that Veynes and Arteries, as in other partes

partes of the body, may be through the same in euery place scatterynge disprsed: nor yet so small and slender in quantitie, that Veynes, and Arteries in the toppe onely braunchyng, are sufficient to nourish and warme the same through out. Whiche prouident Nature foresayng, hath engrauen these cornered implexures, that in them the thinn Membran, replenished with sundry vessels, might insinuate it selfe, whereby to minister nourishment moze fitly to the substance of the brazne.

And chiefly also for the occasion of this nourishment, was the brazne in two partes dissected, that is to say, that the thinn Membran might folde it selfe in the middle thereof, and there made in reflexures, should nourish the substance of the brazne: without which diuision of the brazne, and deepe reuolutions, that part of the brazne, whereas the right side beholdeth the left, should not be nourished. Whereto *Vesalius*.

It seemeth certaine that Aristotle was not a little deceaued in matters Anatomical, whilest he writeth that the hynder part of the head is destitute of brazne, but euery man knoweth that the hynder part is not empty, and boybe, but hath and containeth therein not onely the brazne, but *Cerebellum* also.

As to come to the middest of his substance, we finde two cauities, or rather (for so are they called) ventricles, as one would say, a right, and a left, whiche are long, anfractuons or crooked, stretchyng from the anterior to the posterior part.

There are whiche call these the anterior Ventricle, but *Columbus* rather writeth to terme them the superior: for asmuch as they are contained or situated aboue the rest. These therfore are indifferent large, and endoued with the thinn Membran: wherein is reprehended the error of *Vesalius*, for so much as he denyed the same.

Through these vpper ventricles of the brazne the reticular or net like folde called *Coriformes* are carryed; whose vles doe belong to the generation of animal spirite.

Wherof *Realdus Columbus* chalengeeth to him selfe, the onely and first inuention after this maner. The original begynnynge of these ventricles, is aboue the Bone named *Sphenoides*, towards *Ethmoides*: but the ayze draynen by the nostrils, is conserued a space in that cautie of the forehead, or Cuneall bone, which beyng there altered, ascendeth into those two ventricles which he calleth the superior, or vppermost, and that by the holes of the bone *Ethmoides*: whereas and in whiche ventricles, by continuall labour of the brazne, and motion of the reticular folde, this ayze is mixed with the vitall spirites. And thus are the animal spirites, made of the same ayze lately prepared, and by mixynge with the vitall.

To this end Galen sayth thus, the generation of the animal spirite, hath the vitall his proper matter. Wherfore the whole brazne is contered and woven together with the diuision and distribution of arteries: of which, many diuisions do go from the grounde, or foundation of the brazne into the Ventricle, no other wise, then the veynes descendyng from the toppe of the head. And by these disperfed arteries, vitall spirite is effused into the ventricles of the brazne, which, by mixyng & mixynge with the ayze prepared, as aforesayd, forgetteth y<sup>e</sup> animal spirite.

The vtilite of the animal spirites is not one, or simply to be accompted of, but is extended, and liberally bestowed vpon all the senses: which beyng begot in the cauities of the brazne, disceide vnto the foundation or seate thereof: where the thyrd ventricle is, whiche is a litle, long, and straight cautie, reachyng from the anterior to the posterior part of the brazne.

Not farre from this ventricle the *Sperues of Spinalis Medula* do spring. Wher, for an easie matter for the animal spirites to come vnto, & pearce the sinewes, &c. iiii.

Columbus sayeth  
The hynder part  
of the head is not  
without brazne  
contrary to Ar-  
istotle.

Two Ventricle  
of the brazne.

Those which are  
called the antec-  
ior should more  
rightly be called  
the superior  
ventricles.

Plexus Coriformes,  
The vles.

The inuention of  
Realdus Columbus  
how the Animal  
spirites are be-  
gotten.

Gal. lib. 9. v. part.  
The vitall spirite  
the proper mat-  
ter of the Animal.

Col. Loc. cit.  
The use of the A-  
nimal spirites.

The thyrd ven-  
tricle of y<sup>e</sup> brazne.

The beginning of  
the nerues of the  
spinalis medula.

oz to be carped by them to the organs of sense to giue them helpe, and to ayde the actions of euery member, no otherwise then as, beyng carped through the optic sinewes into the eyes, they minister vnto them the actions of seeing. In like sort as it is to be deemed of the hearyng, and tastyng, and of euery action procedyng from the bzaayne.

But besides this thyrd ventricle thus lately spoken of, it shalbe requisite likewise to describe a fourth, which is betwene *Cerebellum* and the *Spinall marey*: in which place there is a small hole goyng from the thyrd to this fourth cauitie now spoken of, beyng but litle, yet not so small but as may suffice the animall spirites to passe thereby from the thyrd, to the fourth Ventricle. And this is the place wherein is sayd to be contained memory.

The fourth ventricle is not much capable, and is comprehended of the thinne Membran. Where the *Spinall marey*, (as shalbe sayd why we come to the place) is enuironed with a cauitie figured like a wytyng penne, as it were a hole, whereby no man doubteth the contained spirites may passe vnto the *Spinall marey*. Above the thyrd ventricle of the bzaayne, you may behold a portion supereminent, oz appearing ouer it sufficiently white, whiche is called *Callosum corpus*; a Callous body. Under this lyeth an other portion named *Fornix*, and *Psalloides*, in figure of a halfe circle, oz rather an arche, oz bendyng brydge: which on the hinder part leaneth as it were on two legges, but in the forepart on one onely. Whether vnpossible is this body callous, oz hard, oz that after the fashion of a compassed arche made, but to the end that the wayght of the bzaayne might not ruine oz fall vpon the thyrd cauitie.

Betweene these small portions of the bzaayne, namely the callous, & vaulted bodies, is contained as it were, a glasse, so truly called, because it is cleare and crisall lyke, beyng nothing els in this place but the thinne Membran of the bzaayne here doubled: with which duplication of thinne Membran, the superior ventricles are enuironed, which thence retorne downwardes. Whereto if this glasse were wantyng, it were not euident how the right Ventricle should from the left be discerned, and called: forasmuch as by the meanes and helpe of this onely Membran, they are deuiced.

Behind this vaulted part in the extreme part of the bzaayne towardes *Cerebellum*, and in the vpper part of the thyrd ventricle, Nature hath seyned certain eminent partes, whiche in their vpper partes, represent the likenes of Testicles, and so called therfore of Anatomistes *Testes*: neare vnto the which, two other particles yet somewhat greater are to be discerned, called according to their figure clunes, the haunches oz buttockes. Betwene which lyeth that hole, whiche is already noted to from the thyrd, to the fourth ventricle, and seemeth like vnto the fundament. Furthermoze in the forepart of these Testicles (as we call them) stretchyng to the thyrd ventricle, an other part of the bzaayne appeareth, which not vnaptly, but very elegantly expresteth the shape oz printe of a woman. With this body is sene a litle hard Glandule, in colour contrary to the substance of the bzaayne, that is to say, somewhat yellow, couered with the thinne Membran.

This Glandule is called *Pipalis*, oz *Conarium*, fitly representyng the shape of the yerd. So that in the bzaayne wanteth neither the figure of the Testicles, buttockes, fundament, womans shape, nor yerd. The vse of this Glandule *Columbus* holdeth opinion to be for the diuision of the vessell: other some haue contended that the making and office therof was, to shut in the spirite of the fourth ventricle, but that he alloweth not. Galen sayth, that it hath in this place the same office that others in other partes of the body possesse: but it filleth (sayth he) the diuision of the great veyne wherewith all the folde *Choroides*, that are in the anterior

terior ventricles of the bzaayne, are filled. In the forepart of the thyrd ventricle is to be discerned a deeper cauitie, which goeth at length above the seate of *Sphenoides*, and this cauitie is called *Peluis*, oz *Infundibulum*, which is to be Englished a tunnell oz hopper made to receiue the excrementes begotten in the ventricles, and transmit, and carie them to the Glandule placed in the seate of *Sphenoides*. Whiche Glandule in deede is sufficiently thicke, beyng put without the hard Membrans, framed so of the deuine workeman to receiue into it the excrementes of the bzaayne. And this *Columbus* affirmeth to be the place, where the thinne Membran riseth to couer and clothe these ventricles.

And notwithstanding all this sayd, yet before we cease oz giue ouer the description of the bzaayne, note thus much, that in the bzaayne and whole substance thereof onely foure cauities oz hollowes are to be numbred; and moe, oz besides them none, (sayth the same *Realdus*), although some haue affirmed by the cause of whiche error is the intricate oz crooked deduction of the first ventricles, whiche they haue not diligently persecuted oz followed forth to the end, but imprudently haue deemed by that meanes, two other ventricles to be contained in the forepart: which certainly are nothing els but a portion of the first.

Now the discourse of the bzaayne, beyng sufficiently handled, it seemeth necessary consequently to speake of *Cerebellum*. *Cerebellum* whiche hath his place towardes the hinder part of the Scull, vnder the hard Membrans: of which, as also of the thinne Membran it is compassed on eche side: notwithstanding that his circinuations, and turnynges, oz wreathes are not the same, but otherwise then we haue noted of the bzaynes. And this part (sayth *Iohannes Fernelius Ambianus*) is much harder then the substance of that we call the bzaayne, and therfore produceth harder sinewes, and also (sayth he) it is moze dry: where of the extreme part falleth downe the hollow pipe, oz caue of the spine oz backe bones, euen vnto *Os sacrum*: but he seemeth in this to subscribe vnto Galen, who sayth, that the end of *Cerebellum* is the begynnyng of the *Spinall marey*, & for that cause it is the harder, that to all the hard sinewes of the body, it might be a begynnyng: forasmuch as from this hinder part of the bzaayne, no soft sinew is produced.

But notwithstanding that these be the wordes of Galen and Fernelius, two famous men in Philosophicall discipline, yet as men not retainyng the whole summe and scope of Arte to them selues (for so had neuer man that lyued yet) their wordes are not as Gospell in all thynges: to this I say therfore with *Realdus Columbus* that the substance of *Cerebellum* is not hard, but with his turnyngs at length endeth downward in two Proceses: the figure of whiche is like the white and soft woymes found in rotten wood: whose vse is to prohibite, least of the fourth ventricle, pressed by the wayght of *Cerebellum*, the substance should be stopped. And wherof Galen thought that from this *Cerebellum* came harder sinewes, the from the bzaayne, the truth is (sayth *Columbus*) that there hence proceedeth not one payze, nor one at all: Whereto be sure, he purposely marked many tymes and oft: neither is the substance thereof any thyng harder at all, then of the bzaayne.

Thus farre we haue spoken of the matter and substance of the bzaayne. But to speake further of the principallitie of his functions, and to argue moze playnly the noblenes of his nature, by explication of the sundry benefites he yieldeth throughout the frame of the body, behold but the organs of smellyng, hearyng, and seeing: with tast, and tastyng: as also how much he maketh to the motion of members, in stretchyng such an infinite number of sinewes throughout the body, and partes thereof, without the which, no other could be coniectured of the type of man. When is to be discerned by trees and spredyng plantes: which onely

ff.i.

ff.ii.

The conuett where it is and the use thereof.

Only the ventricles in the bzaayne, by the same manner haue images of ventricles.

Cerebellum.

Situation.

Incident.

Circinuations.

Iho. Fernel. cap. ix. Substance.

Fernelius assertion according to Galen.

Of the substance of Cerebellum contrary to Galen.

Columbus assertion.

The woymes in Cerebellum and their vse.

No payze of sinewes springeth from Cerebellum contrary to Galen. The substance of Cerebellum is not harder then of the bzaayne. Whereto the noblenes of the bzaayne is most playnly argued.

How man differeth most from growing plantes.

The fourth ventricle of the bzaayne where the way of the Animall spirites from the third to the fourth ventricle.

The place of memory.

The cauitie in the spinall marey like a wytyng penne.

The callous body.

The arche oz vaulted place.

The vse of the callous body and vaulted place.

The glasse in the bzaayne what it is where, and of what vse. The vse of Diamant double.

The testicles in the bzaayne.

The haunches oz buttockes in the bzaayne.

The hole like the fundament.

The image of a womans printe in the bzaayne.

Glandule pipalis. The yerd in the bzaayne.

Col. Inc. etc.

The vse of Glandule pipalis.

The error of Anatomistes in the vse of Glandule pipalis.

Columbus Test.



How much more exquisite are the sense in man than in other creatures.

The first of the common sense called smelling. Col. ap. 2. lib. 8. The rising of the Membranes of the sense.

Idem.

Idem.

Idem. Johannes Fernell. lib. 2. cap. 18. Galen lib. 9. & 11. de v. part. How haply the dignation of the nose.

Why the Membranes in the organs of smelling are not hard.

Fernell. lib. 2.

The second use of the organs of smelling.

The distinction of the organs of the nose.

Galen lib. 2. Of the organs of hearing. Substance.

Fernell. lib. 2.

Col. 11. lib. 2. v. part. Fernell. lib. 2. How hearing haply the most elegantly in the history of bones, & namely where the offices of the organ of hearing are described.

flourish in growyng, and frutage, but boyde of sense, sight, hearyng, taste, mouyng, and smellyng: whiche are chiefly in the body of man most notable aboue all other creatures, by so much the more, by how much the brayne in man, is different fro all other creatures.

**T**o go forward therefore in the description of these aforesayd organs, first you shall note that in the forepart of the brayne about the seate of foundation therof, the rising of two organs are playne to be discerned, which the Grecians call *Olfactilia*, but other Anathomistes *Processus Mamillares*: whiche are long, and small, consistyng of the substance of the brayne it selfe, only intolued with the thynne Membran. Betwene the brayne, *Os Sphenoides*, and *Os frontis*, these organs are caried: aboue which the hard Membranes are to be discerned, of which we haue spoken befoze.

Thus the organs of smellyng do cease at two litle thicke partes, and those are gayne in the Bone called *Ethmoides*, at the side of a certayne eminent Processe therof. So that of the breath that we draw at our nostrils, part ascendyng by by the nostrils into these sayd litle holes (for so saith *Fernellius*) part of the breath receined passeth this way into the brayne, and the rest into *Trachea Arteria* (we distinguish and finde out the differences, of good and euill fauours.

The which proper organ, to the end it might not haue lightly default in operation, but retayne his vertue more effectually, Nature hath produced in places mentioned, neare to the Processe lately spoken of, two portions of soft finewes: not of auncient Anathomistes therefore called finewes, but we terme them so, since by their rare tendernes, they are the fitter for this purpose to discern the differences of ayze brought vnto them: which to bene hard, no man would iudge it by reason so fit: since they support a more subtil sense, then any other partes in the whole body.

Agayne, a double commoditie is found by these sayd organs. For besides that they thus present all fauours good and euill, vnto the brayne, so do they also, and in like maner, receiue the filthy and stinky excrementes purged from the Anterior, or vpper Ventricles of the brayne.

To these nostrils appertaine a certayne Cartilaginous substance, which in the midst of them maketh a seuerall diuision, or hedge: called therfoze *Narium septum*, or *Interseptum Cartilaginosum*, stretched from the bottome, to the top of the nose: as also to the vpper partes of the palate: for all that region, or part, is replente, with holes, & hollowes, to receiue the sayd superfluities of the brayne.

The eares beyng in like sort the organs of hearyng, are sited in the extreme partes of the temples, of whiche the outward partes are called *Auricula*. The substance of the eares are Cartilaginous or gristely, and not rashly so ordained, for asmuch as thereby the entraunces or passages are made, not onely easier, but also (which is notable) continually open, and prest to receiue the found of euery speech, or other noyse. Therfoze *Dura Membrana*, or the thicker coneyng in clothynge and enuoyppynge the deapest corner or wyndyng of the eares, a certayne soft finew is brought thereto on eche side, from the first coniugation of the brayne, obiected to the holes transuersely, or ouerthwart: whiche receiuyng the ayze of any sounde, carveth and presenteth it vnto the brayne, the notable & common begynnynge of sense.

Thus haue I sayd how smellyng and hearyng take effect in the head, and by what meanes the brayne hath knowledge of both. So in lyke maner you shall here how the noble organs of sight, which to the whole body are to be compared as the Sunne vnto the world, are situated in the head, and how with diuers aydes, they obtaine their action.

The

**T**he eyes therefore are assistant on both sides, the most delietyng and pleasant partes in the body: which no otherwise then circumspect espials in a forte, that watche the bypermost tower, to behold a farre of and giue warning of their enemies: so the eyes are sited in a most highe place, the rather to espyre, and discry thynges pleasaunt, or otherwise hurtfull to the body. *Fernellius* reporteth, taking his authoritie (as he sayth) from Galen, that for cause of the eyes, the head was appointed in the highest place of the body, because the brayne, for the shoytnes of the finewes opticke, stood in neede to be situate so neare the eyes. But such reasons are not disputed on, since the brayne to haue his fastest beyng a loft, and eyes there most sightly seate in the head, no man iudgeth rashlynes or improuidence, not onely because nathing may be amisse, that is wrought by the omnipotent creator, but also forasmuch as the same in the iudgement of worldlings, seemeth so notable, as the thyng, which, otherwise then so, could not haue bene the lyke.

Therefore if in markyng the situation of the eyes, you retayne but some scruple of diligence: no doubt, but as you finde how excellently Nature hath engrauen in the head and bypermost iawes two proper celles or cavitie for their habitation, so will it (eue as it were) rauish your senses, to consider how many mete defences and propugnacles are placed round about their cavitie. Whiche albeit they haue to them selues proper vles appointed, yet serue they besides, so fit for to gard the eyes, as if they had bene for no other purpose ordained. For aboue them is *Os frontis* and the eye browe, beneath, the first bone of the vpper iawe, the bones of the cheeke, likewise the nostrils, and *Os iugale*: besides the gristels of the liddes, and the eyeliddes themselves, which serue to direct the sight.

The fashion of the eyes in man is rounde: which if you marke well, you shall finde that nathing elles in the body hath a direct rounde proportion. But in other creatures the eyes are not directly round, no, rather oblique or deppressed. Neither is that maruelous, whilest the figure of man differeth from all other creatures in no small poynt. Neither more openly, then woorthely, hath *Realdus Columbus* reproued such as hitherto haue made description of the eyes, by requestration of brutish Anathomistes: which clearely he noteth in Galen, and after him *Vesalius*, whose skillfulness in matters Anatomicall no man neglecteth: yet with no small negligēce is he spotted in this point, since, so carelesly to write in a matter so great, excellent, and oft wished he blushed not.

But now to come to the matter, in what place the eye is sited, and for what cause, that is to say, for sight, no man doubteth, but how the sight is made, that is not with facilitie explicable: the strife therof as yet is vnder iudgement, as touching emission, and immission. Some thinckyng to haue obtained truth on their side, are confuted with the fancies of their owne foolishly fablyng. So that one so much hindreth another, as when reason should giue iudgement, conceit standeth in the light: but of this argument we will make no disputation. It is sufficient in this treatise, to shew that the eyes are made for the cause of seying. Which thyng is so maruelous necessary to man as they that either by nature, chauce, or sickness lose there sight, accompt them selues unhappy.

The facultie of seying commeth from the brayne, brought vnto them from the visible spirites by the opticke finewes, which finewes are thicke and soft (as shalbe declared when we come to the description of finewes) enuoypped with the hard and soft Membran, and sprayng out from within the brayne, to the seate of foundation therof: and penetratyng *Os sphenoides* through the rounde holes therof, do end in the inner cavitie of the eyes, whereas they constitute the Membran called *Amphiblastroides*.

The eyes therefore consist of many partes, that is to say of fine Muscles, not with.

Of the organs of feeling.

Situation.

Fernell. lib. 2.

Columbus. lib. 2.

Which and how many are the propugnacles of the eyes. The eye liddes direct the sight. The fashion of the eye in man.

Realdus Columbus reprehendeth all that write of the eyes before his time. Galen and Vesalius were deceived in the workman ship of the eye.

How vision is made is a difficult question.

The blind thynke them selues unhappy.

Whence is the facultie of seying. Of what substance are the opticke finewes. Immission. Retina. Inflection. What doth constitute the membrane called Amphiblastroides or Retina.

## The eight Booke of the

Of what partes  
the eye of man  
doth consist.

Of the muscles of  
the eyes.  
The foure first  
muscles.  
The rising.  
The falling.  
The bise of euery  
of these m.  
muscles.  
Collocat.  
The bise of the  
four muscles in  
bouring together.  
The bise of the  
four muscles  
successively mo-  
uing.

The comparateth  
these foure mus-  
cles to the mus-  
cles of the weel,  
as touching their  
use.  
The fifth muscle of  
the eyes Realdus  
Columbus first in-  
uened.

Quidlibet Met.

Withstandyng that Galen and Vesalius are of much contrary opinion, as in the History of Muscles is playnly set out: five Membranes, and three humours: with Perues, Arteries, Veynes, Glandules, and much fatnes round about.

Of the Muscles seruyng to the eyes, whiche we haue sayd to be five, foure of them are so disposed, as that they seeme to be distributed to the foure corners of the eyes, aboue and beneath, to the right side and to the left. Their rising is from *Os sphenoides*, and *Dura mater*, and are long, consistyng of straight Fibres: and in their endes explicatynge their owne substance, do constitute a tendinous Membran, which endeth at the pannicle *Cornea*, behynd *Iris*: euery which Muscle doynge his office by him selfe, and labouryng without the helpe of the rest, bryneth the eye either vppward, or downeward, to the right hand, or to the left: but if at one tyme in mouyng, they go together, then they hold or stay the eye: but agayne at what tyme they vse not their motion all at once, but one of the successively after an other, the eye is turned round, or in compasse wise. Which diuersitie of mouynges at vnlike tyme, is also to be sene in the foure Muscles addited to the mouyng of the weel. Wherfoze, diuerse motions to be shewed by diuerse mouers and that in them selues diuersly, let no man thincke it an absurditie to beleue.

But now to come to the fifth Muscle, wherof *Realdus Columbus* protesteth him selfe to be the first inuentor: it ampleteth, or embaseth the halfe and more of the eyes, in transuerse manner sited: neuerthelesse, is not to be despised or with slight regarde beholden, since the motion therof is not onely exquisite, but accordyng to the prouidence of God ordained, whereby the countenance of man, is different from beastes: as the Poet hath versified.

*Pronaque cum spectant animalia cetera terram,  
Os homini sublimē dedit, calumque videre  
Iussit, & erectos ad sidera tollere vultus.*

When euery beast, with prone aspect, to looke on earthy mould,  
He had ordained, yet man he made, the heauens for to behould:  
And that he should his countenance vnto the skyes erect.

So by the benefite of this fifth Muscle we behold the heauens, and directly cast our countenance vppward. By it so is made perfect the deuise of so great a worke begon, which serueth and helpeth at euery turne. For not onely the eye may be lifted vp by this Muscle, but be likewise stayed: as also turned round, or agayne contained in his seate vnmoueable still, or stedfast, without turnyng this way or that way.

Wherfoze I am in this opinion further perswaded, that Nature with great foresight, and prouident skill, gaue vnto the eyes this fifth Muscle, participatynge with the proprietie of euery action: & placed it so closely, & nearely wraппyng, or claspynge the hinder side of the eye (as the like she hath done to other partes, whose offices are notable) that if the Muscles of the corners, that is the other foure, or any of them should by outward incontinence, and hurt, be dyspoled of their vertues, this (which by Nature is sited so secretly, that as it is a hand vnto the eye, so the eye is a shield vnto it, for that the one can not be rightly hurt, and the other escape) might minister assistance, least the eye thence forth should be depriued of mouyng altogether.

The other Anathomistes, I meane, such as haue wrytten before the tyme of *Realdus Columbus*, how they haue varied from him in the description of the Muscles of the eyes, I haue most diligently, and directly, in the History of Muscles declared. We ought yet in discussing the frame of the bodies light, further to consider: for amongst these Muscles are distributed the second payre of sinewes from the

Where the differ-  
ence of authors  
as touching the  
muscles of the  
eyes is playnly  
set forth.  
The second payre  
of sinewes of the  
brayne is inuened  
among the mus-  
cles of the eye.

## History of Man.

103.

the brayne: amongst which, the eye, and opticke sinew, a great portion of fat is placed, least that by want of such moystnyng, as it yeldeth, the eye, in perpetuall mouyng might dry and consume. Hereto also are ioyned ij. Glandules, of which the one aboue, and the other beneath, pouryng forth teares in a perplexed mynde, are made also to water and moysten the eyes the better.

But this sayd, to speake of the manifold Membranes of the eyes, they are five in number.

The first of them is the outmost, and hath many names, as all these, *Albata*, *alba*, *adherens*, and *coniunctiva*: it is a pannicle thinne, and white, takyng his beginning from *Pericranium*, and endes at the greater circle of *Iris*: for *Iris* is that circle in the eye replenished with diuers colours: which varietie of colours, proceedeth not throug the humors therein closed, but *Vnea membrana*, the which *Vnea* is not in all persons of like colour, but in some blacker, in some more white, in some blew, &c.

The name of *Iris* is taken of the similitude of the raynebowe in the firmament, so diuersly coloured. But that which you see in the centre, or middle pricke of the eye is named *Pupilla*, oft called in English the apple of the eye: by the benefite and office whereof, we haue sight.

And notwithstanding that the same *Pupilla* appeareth blacke, yet nether it, nor any thyng vnder it (as sayth *Collibus*) is blacke at all, but most perfect bright and thynnyng: albeit I dare not subscribe to him in that.

But as in the contrarietie of opinions; when as euery affection throweth a brade, truth hides her head, whilest reason hath inough to do to defend him selfe: maketh some, not of the simplest Anathomistes, to hold in, and pause in diuerse of their discourses: so some agayne, not regardyng what others affirme, their owne eyes beynge witnesses (though I deny not, the rest to haue used dissections, perhaps yet not so oft, in this respect vpon the body of man) haue playnly without bawkyng depainted their iudgements, vpon such inuentions, as experience hath found them.

For albeit Galen and Vesalius, haue described the eyes farre otherwise, *Realdus Columbus* (nothyng terrified with the face of their authoritie) hath auouched contrary to all their myndes nether more, nor one lesse then five Membranes.

Of which, the second in number that he reciteth neuer any found before him, and therfoze goeth vnnamed. This sayth he is begotten of a certayne kynde of sinewy thynnes of the Muscles of the eyes, and lyng vnder the tunicle called *Adnata*, or *coniunctiva*, before spoken of, is ended neare vnto *Iris*.

The third Membran is called in Greeke *κερατοειδης*, in Latin *Cornea*, and of some *Dura*: so called, for that in cuttyng it is like to a horne, but that it forceth not: in diuerse it is both hard, and thicke, springyng from *Dura Mater* it selfe. Throug this Membran *Ceratooides*, the fashion of the eye is constituted. Whether hath it moze, then one originall rote, or rising: whiche perhaps hath bene the cause of error in others, accomptyng the forepart therof *Cornea*, for that it shyneth like a horne: and the hinder part *Sclerotica*, onely for the hardnes thereof. Whereas it is one onely, and not two, brought from *Dura Membrana*, as I sayd before. *Ceratois* in the forepart therof is bright, & shynyng, and therewith subtile and smal, in which place *Iris* and *Pupilla* is sited: this stayeth the eye, & clotheth both the opticke sinew, and the eye: beynge within hallow, containyng likewise three humors, and three other Membranes.

Now to the fourth Membran of the eye, which is called *Vnea*, and *Chorion*, *Secundina*, and *Choriformis*, springyng from the thinne Membran of the brayne, and is the first that clotheth the opticke sinew: after dilatynge further vnder *Cornea*, stretcheth forth vnto the forepart. Yet for all that, it doth not enwrappe the eye

ff.iii.

all

The use of fatte  
to the eyes.

The situation and  
use of the gland-  
ules in the eye.  
Teares wherewith  
they spring.  
Of the membran  
of the eyes.

The names of  
the first membra-  
ne of the eye.  
The description of  
the membran  
Communi-  
What is *Iris* in  
the eye.  
*Vnea* is not in  
euery one of the  
colours.  
The true logic of  
*Iris* in the eye.  
*Pupilla* of the ap-  
ple of the eye  
which is it.

Vesal. cap. 9. de  
arg. lac. animal.

The second mem-  
bran inuener  
to other Anatha-  
mist.  
The beginning  
and infection of  
this second mem-  
bran.

*Ceratooides*.  
Galen 10. v. f. part.  
Fuch. cap. ix.  
Fernel. cap. 3. li. 6.  
*Ceratooides* consti-  
tuteth the fashion  
of the eye.  
The error of the  
Arabians in the  
membran *Cornea*.  
*Cornea* is one  
onely.  
Cornea what kind  
of one.  
The vtilities of  
the membran  
*Cornea*.

The names of  
the fourth mem-  
bran of the eye.  
Beginning.  
Progress.  
Infection.

The fourth mem-  
bran enuoyppeth  
not all the eye.  
Where p fourth  
Membran is  
double.  
The humologie of  
the Membran  
Vnea.  
Divers colours  
in vnea in man.  
The colours of  
Vnea in an eye are  
more then in man.  
The use of the  
varietie of colour.  
Why the eyes  
being weary we  
winkle.

The fifth membra  
called Retina.  
Collocat.  
The beginning  
and substance of  
Retina.  
The situation of  
Vnea.

The six Mem-  
bra called Aranea.  
Beginning.  
Where Aranea  
is compared.  
The use of the six  
Membran.  
Collocat.

Vitrius obscure  
in the Membran  
Aranea.  
Collocat. 7 cap. 14.  
The Membran  
like p eye holes  
which Vitrius  
mentioned is  
not any thing  
distinct from the  
Membran but  
therein described.

Of the humors of  
the eye.  
Collocat. 10.  
The place of the  
watrisse humor.  
Collocat. 11.  
Where are situa-  
tions made called  
Canaliculi.

The watrisse hu-  
mor is an excre-  
ment.  
The watrisse hu-  
mor being effused  
may renewe or  
grow againe.

The second humor  
of the eye why it  
is called the  
Christalline.

Situation.  
The figure of the  
Christalline hu-  
mor.

all about as *Cornea* is sayd to do. But after it hath come to the apple of the eye, which this same *Vnea* fashioned, and maketh, it is reflected towarde the hynder part, and marcheth forth to the beginning of *Iris*, and there is made two fold or double, and departeth from *Cornea* all that space that is so cleare and cristall like: although in other partes agayne it is not a little knit thereto. It beareth the name *Vnea*, for that the grayne therof representeth a grape, the stalk taken away. In this pointe (as I sayd) that is, as touching the colours of this *Vnea*, great diuersitie is in creatures to be discerned, yea in man him selfe. For *Vnea* in man is blacke in colour, red, blew, and yellowish: but in an Ox, besides those colours, also greene, and bright, blew. By the which varietie of colours the weyered eyes are recreated, & therfore we shut the eyes, to the ende that after quiet rest of the visible spirites, these colours may newly be refreshed.

The fifth Membran of the eye is called *Amphiblastroides*, in Latine *Retina*, chosen of the very substance of the visible *Serue*. Therefore if we properly, and more directly should speake therof, it is not a Membran, but in very deede a thyng soft and white: which if you do behold precisely together with the substance of the *hazayne*, you will rather deeme it the substance of the *hazayne* then otherwise. This lyeth more inwardly then doth *Vnea*, and a little further marcheth forward to the halfe part of the eye.

The first Membran, called *Aranea*, in Latin *Aranea*, for that it seemeth to represent a Spiders webbe, springes in like sort from the thynne Membran, being of it selfe most thynne and splendent: not farre unlike the thynne pellicle founde, vnder the rynde of an onion, whose use is to complet, and refayne the glasse, and cristalline humours.

Herein the great Anathomist *Vesalius* seemed perplexed of sense, in his description of the copweblike Membran. Yet ouer rashly made diuision therof, not knowing that therein was enclosed the glasse humor. Galen is no lesse reproued, in so much as he separated it from that whiche is sited before the cristalline humor. Which *Columbus* affirmeth to be onely one: although the part whiche is sayd to be placed before the cristalline humor, be a little thicker then in other partes. And these are supposed to be the true Membranes of the eyes. *Vesalius* notwithstanding harped vpon a senenth, like the epylodes, which should be put betwene the glasse and watrisse humor. Notwithstanding in deede that those lines, which close about the cristalline humor, are in *Aranea*, as before we haue writt.

After these it followeth fitly to speake vpon the three humours necessarily appertaining to the eyes. That is to say, the watrisse, cristalline, & glasse. Amongest which, the watrisse is placed (being so of Galen called, for his substance and colour representyng the white watrisse part of an egge) betwene the Membran called *Vnea* (where it is made double and inuerfed) and that which is called *Cornea*. Whiche humor is not much in quantitie: and therein suffusions are made, which the younger sort haue called *Cataractes*. This, *Columbus* proueth to be an excrement, for that tyme he had sene it effused, through woodes, and yet in space renewed or sprung agayne, so as the partie sustained the losse of no eye. To which I faithfully subscribe, hauing proued the like in *Anno. 1570*. But to returne to our matter.

The second humor of the eye is *Christalloides*, or *Christallinus*, called so, for because it shineth like light, and in pure clearenes comparable to the cristall. The place where it is sited is towarde the forepartes, almost in the centre of the eye, being amplexed of the hynder part with the vitrious humor, hauing no other Membran interuent or lyeng betwene: but before covered with *Aranea*. The figure of the cristalline humor is round, but in the fore part depressed: where it respecteth the watrisse humor, it is lyke the kynde of a pulse called a lentill. The sub-

stance, of this humor is somewhat hard. The use therof is excellent & most noble: being almost the principall member of sight, pleasant to be marked, and worthy to be knowe, not inuoluntarily therfore call'd the dole, or Image of seeing. Now the third humor called *Holoids*, of all sortes of Anathomistes *Vitreum*, because it representeth fused or moulten glasse. The place of being, whereof is in the hynder part of the eye. Yet not onely holdeth his abode there, but holdeth no small portion also of the forepart, as appeareth, since of foure partes of the eye it is sayd to occupy three: I meane the hollow part. Besides all this *Holoids* is hollow in the middelt for good purpose, giuing place vnto the cristalline humor: being likewise of it selfe most splendent and pleasant to behold. *Aranea* enuoyppeth this together with the cristalline humor, neare to which *Retina* lyeth, which yeldeth nourishment to the vitrious humor, which vitrious in like manner feedeth the cristalline. Therfore no marueile that the vitrious humor shineth so excellently, being the nourisher and feeder of the cristalline more shining. So that by meanes of renewyng these nutricions, that humor is also ingendred, which is called *Aqueus* or watrisse, of Galen *Alluginus*, for the cause before named. And these are the three humors in the eyes, helppng or rather ministring sight: for by their helpe, and by meanes of their round proportion, with the centre in the middelt, and their decent situation, with such visible space betwene, we easely and rightly see. Besides the five Muscles seruing to the eye, as also besides the six Membranes, three humors two Glandules, the opticke sinew, the second payre of sinewes, and fat (all which I haue sufficiently in this discourse distributed) there are both Veines and Arteries, dispersed through the Muscles, fat, and Membranes, among whiche many of them are distributed, as also through *Cornea* and *Vnea*.

This is the most proper explication that I can gather of the frame and woorkmanship of mans eye: to speake playnly and without paynted circumstances, least I might happen to fall within the daunger of soule obloquie with *Vesalius*, who is sayd not onely in the Muscles and Membranes to haue erred, but euen in the humors also to haue wandred out of the way, supposing the cristalline humor to be exquisitely sited in the centre of the eye, as also the quantitie of the watrisse to be equal with the vitrious humor.

Hereto of smelling, hearing, and seeing. Now of tastng, whose chiefest instrumentes (sayth *Ioannes Fernellius* in his 17. Chap. *De partibus corporis humani*) are in the palate and toung, although the toung (as sayth *Vesalius*) by the consent of all Philosophers, is the principall. Whiche office it purchaseth by reason of the two branches of the foure payre of sinewes of the *hazayne*, which distending to the rootes of the toung, are distributed through the vpper coate of it. The other two branches of the same payre passing through the holes of the fourth Bone of the vpper iawe, march through the coate of the palate, to the Anterior part therof.

And thus these foure payre (sayth *Columbus*) were begotten to be the organ of tast. As for the vertue of feeling, which is equally poured out amyg all the partes of the body, I can not define the proper instrumentes therof, vntill the propagation of *Serues* be absolved, to which Nature resigned the whole libertie of feeling and mouyng: that worthely, they might be derided, who affirme one portion of an *Serue* to be endued with feeling, and another with mouyng and without sense.

But before I fall to the particular description of *Serues*, it may be demaunded what a *nerue* is: it is answered, that a sinew is an organ, by the which both sense and mouyng is caried vnto the whole body. Whiche maketh that such partes as are voyde of them, are no lesse frustrate of sense.

ff. liij.

Galen

The substance  
of the cristalline  
humor.  
The use of the  
cristalline hu-  
mor.  
The humologie of  
the name of the  
cristalline humor  
of the eye.  
Situation of the  
vitrious humor.  
Why p vitrious  
humor is hollow.  
Retina nourisheth  
the vitrious hu-  
mor, the vitrious  
nourisheth the  
cristalline hu-  
mor.  
How the watrisse  
humor is be-  
gotten.  
Collocat. 10.

The Epiglogue of  
the partes of the  
eye, and seruing  
to the eye.

Peroration.

Collocat. 11.  
Vesalius erreth in  
the history of the  
eye.

Of the sense of  
tastng.

The tongue the  
cheife instrument  
of tast and how.  
The foure payre  
of *Serues* ser-  
uing to the organ  
of taste.

Of the sense of  
feeling.

They are had in  
decision that  
affirme one *nerue*  
for feeling, ano-  
ther for mouyng.

What a *nerue* is.

Lib. 5. de. v. part.  
Why nature  
made such differ-  
entiation of nerves.

Why nature giv-  
eth not to every  
part like portion  
of nerves.

Collumb. lib. 1.  
The figure of the  
nerve.  
Substance.  
The nerve is  
clothed with dura  
and Pia mater.  
The originall of  
nerves.

The nerves of  
the braine have  
beare ever be-  
des into vij.  
payre

The first payre of  
nerves of the  
braine.  
Substance.  
Beginning.

Intoluerce.

The braine of the  
first payre.  
In the optike  
nerve is no pore.  
The pure spi-  
rites may passe  
through the rare  
finitious of the  
optike nerves.

Of the second  
payre of braine.  
Situation  
Diogenes and  
lib.  
The temporall  
muscle hurt the  
eye to hurt by  
consent and con-  
trariety.

The third payre  
with diogenes and  
lib.

Galen sayth that for three principall endes Nature hath made such distribution of Nerves in the body. The first was to give feeling unto the sensive instrumentes, the second to give motion to the movable partes, and the third to endue all others with that facultie, whereby to discern all annoyances. Albeit that to the Muscles being the instrumentes of voluntary moving the greatest Nerves are given therfore, in this consideration nature hath not distributed to every part like measure of Nerves, to one as to another: but to some more liberally, and to others more sparingly. Even as appeareth by the members of nutrition, whilest none of them are instrumentes either of sense, or motion. Nature hath given them therfore small Nerves, onely to be partakers of the sense of knowledge in any paynefull annoyances.

The figure of a Nerve is long and of round proportion, of substance soft, and porie also, to give perfect passage to the animall spirits infused among the partes. And this substance of the nerves is endued with the tender, as also the thicke Membran of the braine, to be of more abilitie.

Their distribution is divers, but their originall is from the seate or foundation of the braine, neare to the third Ventricle: from whence they spring, both to the right side and to the left. And for as much as all that hitherto have writtten of them, do describe their proceedinges by payres, which are in number vij. in which point there is not one of them that differ from an other (although in other cases but seldome may we say so.) we will also in this present discourse observe the like order, as touching the vij. payre of sinewes of the braine.

And to beginn, the first of them therfore are indifferent thicke, and also soft, whole rising is somewhat distant from the anteriour seate of the braine, where, as above the cell of the bone called *Sphenoides*, they are united: but not crossewise, as some have dreamed. For whereas they ioine together a little space, they separate againe shortly, the right one passing to the right eye, and the left, unto the left eye. But note a little as touching their involucre, for from their beginning lately noted, to the hole sited in the roundell of the eye, through which they passe, they are onely bewrapped with the thinne Membran: but from thence to the eye, in which they end, and make the foresayd Membran called *Retina*, in that space (I say) they are entwapped both with the thinne, and also the hard Membranes.

These are called *Nervi optici*, that is, the visible sinewes, & that because they bring the vertue visible unto the eyes. They do consist of a spongy substance of the braine, but not manifestly replete with pores as some say: yet not to be denied, since their substance is both rare and also soft, but that they prepare passage for the purest spirits. And thus much of the first payre of sinewes.

The second payre of sinewes is brought through their proper holes, & through a rift or chinke of the roundell of the eye, to the five Muscles serving to the eye, and to these two that open the eyelid: besides that they send yet further (in some) a branch into the temporall Muscle: whereby in deede many tymes it happeneth, that by the hurt of the Muscle of the temple, the eye also is hurt, as it were by consent: and so againe on the contrary part.

The third payre of sinewes rising more backwardes, & as it were sidewayes, hath two beginninges, wherof the one is greater, the other lesser: this payre per-  
fectly the scalp, and descendyng downewarbes by the same hole which is not onely common to this, but likewise to the fourth coniugation of sinewes, is cut into many branches, whose distribution therfore is very diverse. For the one branche crosseth to the temporall Muscle, the other to the roundell of the eye, and through the eyebrow to the forehead, as also to the Muscle that closeth the eyelid, likewise to the Muscle that belateth the nose, and to the nose besides procreateth an infinite number of branches. An other branche of this third coniugation of nerves

ues taketh also the way through the roundell of the eye, but lower. It passeth downewarbes by the third bone of the upper iaw, through that hole which is placed about the middle part of the face, as shall readely arise in the parte of re-  
membrance by reading the description of bones: to the which place when thus (as I said) it hath brought it selfe, it is there further divided into many sinewes, which solve them selves among the partes of the upper lippe, through the Mus-  
cle named *Massetera*, and among the Muscles of the cheek: of which small si-  
newes also, a part enter the cautie or hollow of the nose. An other branche cometh to the rootes of the upper teeth, an other descendeth the neither iaw, wherof a  
portion in like sort is distributed to the rootes of the lower teeth. Such store of the  
as remaineth, besides these now spoken of, coast about the copasse of the chinne,  
nether leavyn the lower lippe boyde or destitute of sense.

The iij. payre of nerves ariseth so neare unto the 3. that the originall of them  
seemeth a portion of the third. But it is lesse then the third, wherewith it descen-  
deth towardes the mouth, & is cut into iij. several branches, which passe through  
the holes of the v. bone of the upper iaw, & thence march forwardes through the  
tunicle of the palate towardes the forepartes. Besides these, other two little bran-  
ches descende unto the Processes called *Stiloides*, & so to the rootes of the tongue, be-  
yng distributed through the upper coate therof. And the distributio of these bran-  
ches to these last recited partes, are to make perfect the organ of tast. Which gift  
and office, though some Anatomistes not of the playner sort, have ascribed to the  
third payre of sinewes (which might happen through the vicinity of the iij. with  
the fourth) it shalbe to me no cause of stay in this my present pilgrimage.

The fifth payre of sinewes, rising at the same seate or ground of the braine,  
and on y laterall part about the middle, entereth the blind bone & laberinth the si-  
ted in the temporall bone, which laberinth (being in the histoy of bones playnly  
described) endeth at the eares. So when it is come halfe way within this labe-  
rinthe, becometh thicker, & doth not onely constitute a meabā. This I say is y hol-  
low, which we have described more diligently in the histoy of bones, wherein the  
iij. little bones so mercurially serving to the gift of hearing, are mentioned. The  
one of which iij. no Anatomist as yet saue *Realdus Collibus* hath declared, nether  
I thinke so do. So the sharpe Processe of y little bone which is like y similitude of  
y thighe, a little nerve endeth derivend frō this v. payre of foresayd, frō which a little  
with the sinew issueth into this laberinth: but it goeth forth through y hole of the  
temporall bone, which is placed at the rootes of the foresayd *Stiloides*. This little  
nerve is towardes y forepart recited, & like a serpent entred into y temporall Mu-  
cle. In y same place an other little nerve is found, which is it selfe wretched also.

The vi. payre of sinewes is at the posterioir seate of the braine, or more back-  
ward discerned, having divers branches or rootes: and as (Galen sayth) by how  
much the nearer they spring to the Spinall marie: by so much they are also the  
harder. This payre descendeth through the hole that is sited betwene the bone of  
the hinder part of the head and the temporall bone, in place where the inner Clepne  
*Inguaris* ascendeth to the Scull. The vi. payre of sinewes is at the posterioir  
seate of the braine, or more backward discerned, having divers branches or  
rootes: And (as Galen sayth) by how much the nearer they spring to the Spinal  
marie, by so much they are also the harder. This payre descendeth through the  
hole that is sited betwene the Bone of the hinder part of the head and the tempo-  
rall bone, in place where the inner Clepne *Inguaris* ascendeth to the Scull.

This vi. coniugation is diversely distributed, for it carrieth sense not onely to  
all the partes within the breast contained, but stretcheth further, and visiteth all  
the bowels of Abdomen. After that the right Nerve of this vi. payre is gone out  
of the place above named, it sendeth certaine branches to the Muscles of *Hioides*,

The hole in the  
middle of the  
face.

The situation of  
the fourth payre  
of nerves.  
Distribution.

106.

The situation of  
the fifth payre of  
nerves.

The bones of  
the organ of hear-  
ing.

Galen lib. 2. v. 10.  
Vapant.

Coll. lib. 1.  
The situation of  
the first payre of  
nerves.  
Distribution.  
The histoy of  
the right nerve;  
cent nerve.



Arterie Carotida.

What is Glom.

The history of the  
left recurrent  
nerue.

Of the  
the use of the  
Arterine Ner-  
ues

The use of the  
Arterine Ner-  
ues. To be  
caused in quere  
distributions.

His purpose  
of the  
distribution of  
the left recurrent  
nerue.  
To be  
caused in quere  
distributions.

Of the  
the use of the  
Arterine Ner-  
ues. To be  
caused in quere  
distributions.

Of the  
the use of the  
Arterine Ner-  
ues. To be  
caused in quere  
distributions.

and to some of the Muscles of *Larynx*: then it descendeth betwene *Vena Ingularis*, and the Arterie *carotida*, nigh the rough Arterie, euen to the Canell bone. In the region wherof, is sent a litle sinew vnder the right *Axillaris Arteria* which after is reflected towarde the head, and cleaueth to the sides of the rough Arterie, innuauyng it selfe into the cavitie of *Larynx*, and at length in the formall instrumēt of voyce, named *glottis*, is implated. And this is the true & brief description of the right recurrent, or reuerfine Nerue.

But agayne vnder the regio of the Canell bone it sendeth forth a litle bzaich, which runneth not onely to the pannicle *Pleura* (whiche I haue sufficiently discouered among the spirituall members) but likewise to the rotes of the ribbes: agayne sendyng an other litle Nerue to the right side of the lunges: the rest descendeth beyng fastned to *Esophagus*, downe to the vpper Orifice of the ventricule.

The left recurrent Nerue, departing from the place where it beynneth, yeldeth litle bzaunches vnto the same Muscles that the right did, and descendeth likewise in the same sort: and in the region of the left Canell bone sendeth bzaunches to the pannicle *Pleura*, to the rotes of the ribbes, and to the left side of the lunges: Then further descendeth, till it almost touch the greater bzaunche of the Arterie *Aorta*: In which place it sendeth forth a Nerue, which vnder this Arterie is reflected, and after turneth it selfe agayne vpwordes, towarde his originall and fountaine, cleauyng (as by the right is sayd) to *Aspera Arteria*: thence forth entryng in betwene the Bone that is not named, and that which representeth a shield in the inner part of *Larynx*, and so entreteth into the organ of voyce.

These are the noble Nerues, which (sayth Galen) are endewd with the vertue of formyng the speach, and are besides therfore called *Vocales nerui*. Whose offices and vses are to much neglected, & to litle amongst other thyngs knowen: for although few (in comparison of the rest) suppose in them to be contained the proper power of vocall vertue, yet (to their great admiration) if they willingly dulcet a luyng dogge, they shall proue it playne and very truth: for by diuidyng one of them you shall finde him maimed of his voyce, but hurt them both in that order, and he shall be donne for euer after.

So this I must needs subscribe, for often haue I of purpose proued it: beyng so playne and a part to all that behold it, as that no doubtfull question can grow thereof. Notwithstanding that, some will scarce beleue their owne eyes. Galen was the first that inuented these reuerfine nerues: albeit he could not satisfie him selfe in the reason wherefore nature did not conuert the left recurrent nerue to the left *Axillaris Arteria*: when as from the left recurrent sinew, an other litle nerue spryngeth, which, followyng the rotes of the great Arterie, is distributed through the coate of the hart, but pearseth not the substance thereof for the liness of it. And this is (sayth *Columbus*) the true cause why nature reflected the left reuerfine nerue vnder the great Arterie, and not vnder the Arterie of the arme: hole on that side, as the right reuerfine nerue is sayd to haue done on the other side. Whereat (I sayd) Galen stode much amased, neither could sufficiently satisfie him selfe in the reason thereof, as appeareth in his viij. booke *De vsu partium*. But by this it seemeth that nature, as well as to create these notable partes, had care to place them from all easie annoyances: as appeareth by this nerue lately recited, which is otherwise reflected then the right recurrent, least it, beyng so very small, in the mounges of the hart so continually, should happen in the tyme of breathing to be broken.

That portion that remaineth of this recurrent nerue, descendeth along *Esophagus* downe to the vpper Orifice of the Ventricle. But as soon as the right recurrent nerue, and the left, are come to the same vpper Orifice of the Ventricle, they are straight way denided into many litle Nerues, like nettes, and thus do imbrace

the vpper Orifice aforesayd. Which are the cause in grieues & paynes of the mouth of the ventricule, that the hart it selfe is thought to ake. And this disease is called *Cardiacus dolor*.

Then agayne the right from this part departing, stretcheth forth to the *Spem* bzan that innuolueth the liuer, and an other part also to the vessicle of choler, an other to the left kidney, and to the vpper part of *Omentum*. Besides all the bzaunches that it committes to *Mesenterium*.

After the same maner the left recurrent nerue is bzaunched to the splene, to the nether part of *Omentum*, to the left reyne, and to the bladder. And in men thus end the recurrent nerues. But in women, after all these places, they passe further vnto the wombe or matrice.

Now to describe the viij. payze or coniugation of sinewes, whose rising is more toward the hinder part of the head: but from the bzaune, not from *Cerebellum* as Galen would with many small rotes, whereto is dedicated a proper hole sited after an oblique maner in the aforesayd part or *Occiput*: through which as soon as this hath made egress, it sheweth it selfe first towarde the Anterior partes, and into many Nerues, belated to the Muscles of the toung, *Hyoides* and *Larynx*, is denided: Of which the greater runneth vnder the nether iaw, and so vnder the toung to the extreme end thereof, to make it partaker of sense and mouyng vniuersally. But the fourth payze as we haue sayd before, is it that bzynges the sense of tastyng to the toung: and the toung therfore is sayd amongst other giftes to haue the discretion of tastyng.

These viij. payze or coniugation of Nerues, are all that are remembred either of the auncient, or later Anatomistes, as touching the sinewes coniugated fro the bzaune: yet *Vesalius* seemed to smell an other (sayth *Columbus*) but whether it were for that he would not go aside from auncient authorities, or otherwise, it is not knowen: he concluded at length that it was in his iudgement, the rote of the fist coniugation. But *Columbus* doubteth not, that vnder the seate or foundation of the bzaune towarde the fore partes, goeth an viij. payze, which through a proper hole in the bone *Sphenoides* passeth to the temporall Muscles, to the Muscle luryng in the mouth, called therfore of Galen *Latitans*, and to the thyrd Muscle also of the nether iawe called *Masseteres*: the originall of this beyng distant fro the fist payze of sinewes sufficient inough.

Besides all which we haue hitherto yet sayd, in declaring the originall and distribution of the viij. payze of sinewes proceeding from the bzaune: and besides also the viij. and last spoken of, you shall heare the opinion of *Realdus*: who by his often search and diligence, doubteth not to proue a ix. payze or coniugation of nerues, which no man before his tyme euer wrote or inuented. And this is (sayth he) a slender payze, beynnynge at those two foldes, or two together Procelles of the bzaune called *Nates*, *Penes*, *Testes*. These beyng thynne and small, walke towarde the face, and passe also to the secōd payze, and are scattered into the thyrd Muscle of the eye liddes, fifth also bzaunchyng out to the fist Muscle of the eye.

In dyce as he doubteth lest some, or most will not admit his late inuention of these two last payze of Nerues, but, holdyng them selues more steadfast to the same of authorities, will rather accompt them as the rotes of others: so he protesteth not to confende therein, neither will we pretermitt any tyme in discussing the matter. For me thinketh it sufficeth vs to know the bzaunchyng of the Nerues, as also perfectly from whence they procede: which may be well inough, without so many sundry diuisions, namyng (except it please the gentle Reader) nether viij. nor nine payze: onely be diligent to finde out how nature hath made their distribution.

Galen, in his ix. booke *De vsu partium*, fully affirmeth that the harder sort of sinewes

the mouth  
of the ventricule  
paynes the hart  
seemeth to ake.

Another distribu-  
tion.

The situation of  
the viij. payze of  
Nerues.  
From the bzaune  
not from *Cerebellum*  
sprynging the  
7. coniugation of  
sinewes.

Col. Ibid.  
Vesalius graued.

The description  
of the viij. payze  
of sinewes or the  
bzaune.

The description  
of the ninth payze  
of sinewes or the  
bzaune.

as in the text.



sinewes are onely made and ordained for the cause of moving, but otherwise vnapt for sense: agayne the soft sinewes, in like sort, to indiffer sense to the singular partes of the vniuersall body, being not so able for moving as the rest. Wherefore the harder sort of nerues, haue their originall from their Spinnall marey, but the hardest of all from the lower partes thereof: the soft then agayne are brought from the braine, but of those likewise, the nearer to the Spinnall marey, so much also more harder then the other. So that by this reckning, Galen accompteth this of the sinewes, that the softest are the perfect sensible, the more hard the further from perfection of sense, but the hardest of all, to be not farthest of onely, but (sayth he) altogether vnapt for sense. For which Realdus Columbus, no otherwise then reuerently reprooueth him, assuring vs, that there be no nerues in the body (the visible onely excepted) but carieth with him both sense with moving, and moving with sense. But now, since we haue laboured sufficiently to prosecute the order of the vii. payre of sinewes, we will presently resort to the nerues of the Spinnall marey, called also *Cerebrum elongatum*.

As the marey of the Spine or ridge of the backe is esteemed by the consent of all Anatomistes, to be of the like substance, that the braine is, whose originall also is the braine, stretched forth long wise through the turning ioyntes to *Os sacrum*: So is it no lesse strongly munited and armed with defensive propugnacles called the Vertebres, or turning ioyntes, then the braine by the inclosure of the Scull, or bones of the head, as I haue sayd before, euen abundantly in the history of Bones. And this is to be noted of the Spinnall marey, that as the braine, so this marey thence produced, is couered with the like two Membranes, as *Pia mater*, and *Dura Mater*, or *Crassa Membrana*: which enuolue the same, and to the outmost end of this elongated body. Whereof the one next the substance, and the other on the outer side of that agayne, to defend the same from the ruinous actions of the Vertebres.

This although it is called marey, yet thereby we vnderstand not such marey, as is the cauities of other bones, for neither is this so fat or soft, neither is the other couered with the Membranes of the braine, as is the Spinnall marey, neither is there with it any communion with the instrumentes of sense, or Muscles. Agayne, the Spinnall marey differeth from the braine in two thynges. For first, the braine hath *Diafole*, and *Sistole* like the hart, (as before we haue sayd) but so hath not the Spinnall marey. Secondly this marey is carped through Bones which are moued, but steadfast and stable are the Bones of the Scull, compassing about the braine.

The beginning of the Spinnall marey is double, or two fold, the one more, and the other lesse: the more part springeth from the braine, but the lesse from *Cerebellum*. And agayne, that that is brought from the braine, is onely one manner of way or fourme, but from *Cerebellum*, two fold, or deuided into the left, and right part. But the greater beginning of it proceedeth in such sort from the foundation of the braine, as it seemeth to be the very ground thereof.

Wherefore to speake apertly, it springeth from the fore part of the braine: from thence therefore is to be taken the beginning thereof (as sayth Columbus:) then not in the place where it first entreth into the Vertebres, as it pleaseth some, in which place it is endewed with no circumscription. And if then the beginning thereof be in so high a place to be appointed, are we not forced to graunt the third, fourth, fifth, sixth, seventh, and eighth payre of sinewes not to spring from the braine, but from the Spinnall marey?

This marey entyring forth of the hole of *Occiput*, into the first of the turning ioyntes, is somewhat more thicke then in the whole progresse that it maketh besides. But agayne at such tyme as it cometh to the top of the best, it is thence

to the toppe of *Os sacrum*, of equall thicknes. Although some, not of the nearest, supposed it in the meane space to walle by the getting of nerues, who as in deed in *Os sacrum* onely it becommeth more slender.

In going forth of the Scull it is clothed with *Pia*, and *Dura mater*, therefore it clotheth also those Nerues that stretch forth from it. But when it must passe through the mouable Bones, nature added thereto an other thinn Membran, least the same marey should any way be hurt by the hardness of the Bones. In which Membran Galen is thought to be deceived, for because he esteemed this third tunicle to be a Ligament, wherewith the Vertebres should be conected and knit together. Which to be true, thinke how: since the turning ioyntes besides are not destitute of the proper Ligamentes, as in the History of Ligamentes appeared. For no man can surmise, or iudge this thinn tunicle to be fit or apte in colligating and binding together these bones, whose motions are so great.

The Spinnall marey therefore is founde marey like, or medullous onely to the extreme part of the best, but then in marching thence forward, it appeareth finely: like whereto are the sinewes thence proceeding. But this esteeme to be by meanes of the diuision thereof. Whereby it is easie to be discerned, why some matter descending through the Spinnall marey, the greater hurt is felt in the inferior part. The cause is very apparant: for that in this place it is finely, but in the other medullous, or rather a portion of the braine elongated, as we haue sayd before. For els it may seeme, that we vse this word medullous improperly: since that is onely marey, which nourisheth the Bones. To which in nothing this is like: neither yet is the Spinnall marey (though Galen him selfe would haue it so) softer, then that, wherewith the bones are nourished.

And had not the almighty creator thus produced it of two thynges, the one had come to passe. For either all the partes of the body vnder the head, and besides the Nerues of the vii. payre and admitting no branches of the sinewes of the braine, should haue bene destitute of the arbitrarious moving, and frustrated of sense, whereby now so exquisitely they haue the knowledge of euery annoyance: or els of necessity to euery part of the body a nerue from the braine must haue bene deriued. But if they had wanted indueing, then no more had man answered the fourme of a liuing creature, but a picture rather of stone, or clay: and on the other side, from the braine to reach both small & great nerues to euery part, had bene the part of a workeman, little wayeng the securitie of the nerues.

Wherefore the Spinnall marey was provided, that there hence Nerues might spring to fulfill all other partes of the body with sense, and moving: which are otherwise destitute, for any of the vii. payre of the braine, that visiteth them. When that this marey should be of affinitie with the braine, which provideth so noble partes to the body, who can doubt, sayne say, or inueigh to the contrary, vnlesse he beare armour agaynst truth.

It is described by Anatomistes diuersly, as touchyng the partes of sinewes traduced from the Spinnall marey: but because we will consume no tyme to answer, and reply vpon euery selfe opinion, for seemyng ouer correctiue, as some are ready to object, we will fall to the onely distribution of Nerues. What is, when they proceede, and how they are after solue abroad among the partes of the body.

The first payre therefore of these Nerues is sent forth betwene the bone of the hinder part of the head, and the first Vertebre of the necke, so priuely, and artistically, as that the motions of the head are all together denyed to iniurie them. And to the end this might safely be brought to passe, nature hath engrauen a proper cautie, as well in the bone of the hinder part of the head, as also in that side of the first Vertebre, or turning ioynt of the necke, which ought to end at a spine,

The structure of the spinall marey.

Galen lib. de Offic. bus.

The spinall marey in marching forward becometh finny.

Why hurt in the inferior part of the spinall marey is greater.

Cal. in error.

The necessity of the spinall marey.

The vse of the spinall marey.

Columb. lib. 1.

The first payre of nerues from the spinall marey.

Columbus lib. 1. All the nerues (except optike) carry sense & moving.

Of the nerues of the spinall marey.

Columb. lib. 8. Cap. 4. Fuch. lib. 6. cap. The inuolucres of the spinall marey.

The difference of the spinall marey from the marey in other bones.

The difference betwene the braine and spinall marey.

The beginning of the spinall marey is double.

The greater beginning of the spinall marey.

The beginning of the spinall marey where. The course of same.

Where the spinall marey is thicker.

of paynt. This conuigation of nerues thus departing, are afterwarde dispersed into diuers and sundry litle bzaunches, both by reason that the payre it selfe is but small, as also more commodiously to be distributed vnto the notable company of small Muscles that serue to the head. For they arose the first Vertebre, and were caried to the hinder part of the head, and agayne, from thence reduced to the second Vertebre. But before it go forth, is reflected aboute the Spinall marey: a thyng notable to behold.

The second payre, of conuigation of sinewes, because of the impossibilitie of commynge forth at the sides of the Vertebres, as appeareth, hath two beginnings: whereof the greater appearyng backwardes, is caried here and there by the sides of the Spine of the second turning ioynt, whether once beyng come, it deuideth it selfe into very many partes & bzaunches, which reflected presently vppwardes, stretch forth to the skynne of the head, to the eares, and to Muscles there aboutes. The other begynnynge lesse then this, commeth forth by the forepartes, betwene the first and second Vertebre, by the sides of the toth therof, (as appeareth) by the description of the second Vertebre, in the histoy of Bones) and is distributed to the first Muscle of *Larynx*, which is common to *Esophagus*.

The third payre of sinewes engendred of the Spinall marey, creepeth through the common hole of the second and third Vertebre, & from their sides as you haue heard by the rest. Then after hath a former diuision, which is into foure partes of bzaunches, but those not so contented are into very many partes, some to the Muscles of the head, & to that long quadrangular Muscle brought from the fleshy *Epibzian*, which obliquely bzaureth the lippe downward, some to that long Muscle that pulleth the shoulder blade vppward, & others to the skynne of the necke, ramified.

The fourth payre passeth forth betwene the iij. and fourth Vertebre, through the common hole to them both, which in like sort is to be vnderstanded by all the other that follow: therfore remembre it, for the criture of the nerues through the hole common to two Vertebres, I will repeate no more hereafter. This payre thus passing forth (as I say,) is into diuers bzaunches deuided, whereof some ascende, some descende, and others beue them selues to the hinder part. Further more from this payre are sent small sinewes seruing to the Muscles of the necke, as also to the Muscle called *Cucullaris*. But among the fore partes of bzaunches, some are inserted to the Muscles, stretched vnder the stomache, one of the which, being a small one, is vnited with a bzaunch of the first payre, and the first with the first of the which three begynnynge are constitute those *serues*, which march forwardes downe to the *Septum transversum*, descendyng by *Mediastina*, and aboute *Pericardium*.

The goyng forth of the first payre is found betwene the fourth and fifth Vertebre, deuided thence into many *serues*, both anterior and posterior. The anterior bzaunches, which is most of the others apparant, is vnited with a bzaunch of the fourth payre, and in some, taketh a litle bzaunch from the others that follow. This nerue, thus made and constructed of three, descendeth to the sides of *Esophagus* by the fore partes of the turnyng ioyntes of the necke, and so downe to the sinewy partes of *Septum transversum*: In which part the end thereof is determined. *Columbus* sayth that in some this riseth from the fourth payre: but that is seldome, for it is most often founde to procede from the first.

But note when first this commeth to the hollow of the brest, least the continuall mowing of the lunges should be a meane to hurt or breake the same, it is bounde of *Wayes* with certayne *Membrans*, both aboue and beneath *Pericardium*. This nerue with a veyne is properly associated.

And no maruell (gentle Reader) that nature so willingly provided for the safe conduct of this *serue*, since to the myddle it was destinated: a Muscle so rare and

and noble, as in all mans body is none the like. That which remaineth of this first payre of conuigation is diuersly dispersed: for a bzaunch thereof accompanied with a Veyne and Arterie, is sent through the myddest of the hole that is fitted in the shoulder blade, and there spent amongst the Muscles that from the same scaple bone do spring.

An other bzaunch descendeth through the sides of the necke, and is distributed to the Muscles called *enquada* & *Cucullares*. Other bzaunches stretch to the shoulder, others to the fouresquare Muscle that bzaureth the lippe obliquely downwardes, as also to the iij. Muscle of the bone *Hyoides*. Sundry others to the cavitie of the shoulder blade, where there are entred to the Muscle there lurking, and to the second Muscle of the brest, as also to the skynne there aboutes.

*Vesalius* numbeth this first conuigation amongst the *serues* of the arme, because it is spread forth vnto the Muscles seruing the shoulder. But *Columbus*, because it goeth not together with the *nerues* of the had, will in no wise to accept it. Of the which *serues* of the had, because of the true Anatomistes it is much wished, we will now addresse vs towardes it, that truth the gemme set in order, the soyle may the more perisite.

The hand, being (as sayth Aristotle) the organ of organes, and an organ before all other organs, to the end it might excell in the sharpe sense of touching, nature hath chosen, and geuen thereto five proper and needfull payres of sinewes, that is to say, three to the extreme fingers, and two to the extreme had. All which five payres haue their originall from the Spinall marey, goyng forth by the common holes of the Vertebres of the necke, and the first turnyng ioynt of the brest. And these after they be gone forth from their risings, as is sayd, are so vnited afterwarde together, that one payre from an other it is almost impossible to distinguish. Fewer thelesse they are at length separated, seemyng to constitute and frame them selues after the fashion of a net.

These five payres of sinewes march forth with one consent vnder the chanell bone, as also to the inner Proesse of the shoulder blade. In the which place also they are accompanied with *Vena Basilica*, & *Axillaris Arteria*: wherefore no maruile though a wound in this place be fearefull and dangerous. But to go to euery one of them seperately.

The first payre of *serues* to the handes is brought forth betwene the first, and the first Vertebre, when it is come to the cavitie vnder the armehole, it sendeth forth a nerue to the first Muscle of the brest, and to the second of the scaple bone, and a bzaunch in like order to the first and second Muscle of cubite, whereby the same is bowed. Furthermore, if you willingly follow it further, it runneth vnder the first two headed Muscles through the inner part of the shoulder, but after the bought of the cubite, it accompanieth with the common Veyne, and both together as it were with one tract, are deduced to the extreme part of the had. But in that space not ceasing to poure forth sundry litle bzaunches to diuers partes of the skynne there aboutes.

The going out of the second payre is according to the same iourney & place that we haue described to the first, so then it sendeth three *serues* to the Muscles that serue the shoulder, whereof one issueth out at that hole of the shoulder blade that lurketh vnder the armehole, being first diuersly distributed, the after is caried straight forth after the fore part of the shoulder to the bought of the arme, passing there betwixt the bone *Cubitus* & *Radius*: but note that at what tyme it entred into the bought, it disperseth it selfe in bzaunches, which are bestowed on the 4. 5. & 6. Muscle, by whose meanes all the five fingers are bowed. But so sone as it is passed & gone beyond the myddest of the bone *Radius*, it putteth forth a nerue sufficient apparant and dope, which cleauyng as it goeth to the Ligament that is set betwene

Vesal. lib. 4. cap. 14.  
The opinion of Columbus.

Why the nerves of the hand are particularly described.

The hand is the organ of organs.

Five payres of sinews to the hand.

The beginning of the five payres of sinews to the hand.

Where they are vnited, where they are separated.

Why woundes to the inner proesse of the scaple bone are deadly.

Of the first payre of nerves of the hand.

Of the second payre.

5.  
Division and distribution.

Col. libid.

The myddle a noble muscle.

Col. I. 8. cap. 1.

the *Bones Cubitus* and *Radius*, is at length implanted to the quadzated or foure squared Muscle in the histoy of Muscles manifest: which beyng sited neare vnto the wrist, moueth the hand directly downewardes in prone maner. The greater trunke of this same nerue descending further, and lower, creepeth vnder the Ligament that lyeth on the inside of the wrist, in which place it bringeth forth sundry branches duely dedicated to the Muscles of the thombe, and others to a position of these Muscles, which we haue called long Muscles, and belued to spring from the Tendons of the fist Muscle. Other branches likewise it sendeth to those Muscles which, rising from the postbrachiall part of the hand, do bowe the first ioyntes of the fingers. Which bone, in the palme of the hand it is cut into v. partes, but some tyme into seuen, though not so often. Of which fine partes, two marcheth forwardes through the sides of the thombe, to the extremitie thereof, in the meane tyme here and there distributyng their furcles to the skinne: two other parte themselves to the extreme partes of the forefinger, in the meane tyme neither laying wast the skinne & compass about them. The fist runneth through the inside of the middle finger. And these are the fine partes: but in such as it is deuided into vii. partes, note the vi. iourney through the extreme region of the middle finger, and the vii. through the inside of the litle finger. And thus much of the second payze of sinewes seruyng to the hand.

In the ball of the hand sometime v. Sometime vii. Nerves.

Of the third payze.

The thyzd payze so addicted, after the selfe same maner runneth downe after the side of the shoulder, and inferiour partes of the cubite, as also about the ioynt betwene *Diechranon*, and the inner *Tubercle* of the shoulder, where it bringeth forth diuers branches, which through the first Muscle, of which is made a large Tendon, may easily be found scattered, as also to the second and thyzd Muscle of the wrist. Then it marcheth after the length of the cubite on the inside, about the middlest wherof, or litle moze it is deuided into two partes: the one greater, and the other lesser, & the one agayne taketh his race moze depe, the other moze outward. That which runneth inward, passeth vnder the inner Ligament of the wrist, there ramifying to that first Muscle with a broad Tendon, which *Columbus* first obserued, & from thence to the vi. Muscle which leadeth the litle finger from the rest: not ceasing to yeld the like kindnes to those Muscles that exte or stretch forth the fingers, which (in the proper place) we haue sayd to spring from the tendons of the first Muscle that boweth the thyzd ioynt of the fingers: neither denyng to assist the Muscles that bowe the foremost ioyntes, and which cleaue to the postbrachiall bones: this done it seuereth it selfe into thze, and sometime into v. which stay their courses at the extremities of the fingers, beyng through the sides of the ryng finger and litle finger delated, although sometime it is founde to stay about the middlest of the middle finger. Beyond all this it imparteth slender branches liberally to the skinne all about, & namely to the palme of the had, which maketh it become so sharply sensible, and exquisite in touchyng. But now to come to the lesser bowe or branch before deuided. This, straying through the exterior partes of the hand, is reflected about the wrist, there into thze proper rames specially deuided. But in some preparyng fine casteth them through the vpper of the backe of the hand. So through the sides of the litle finger & ryng fingers, and through the halfe of the aforesayd middle finger, and to their extremities committed in like order as is declared by the other on the inside: Duely in this differyng, that the inner are much greater, then the outer Nerves, most nobly done of Nature, who was not ignoraunt that the outer might with moze facilitie be hurt then the inner.

Why the palme of the hand is so sensible.

Of the fourth payze of nerves to the hand.

The fourth coniugation of Nerves prepared for the handes, is greater then all the Nerves thereto distributed, and taketh in hand the like rising and iourney as doth the rest, but when it is come very neare to the middlest of the shoulder, it

is

is reflected to the exterior and superiour partes thereof, whence and in what place issue forth litle Nerves to the Muscles that bowe the cubite, and further to the exterior Muscles, not neglectyng the scope of the skinne to the cubite and shoulder appertaynyng. Among diuers other Muscles there aboutes, this fourth nerue lurketh, wherfore branching along by the *Bones Radius* and *Ulna*, after that by such means the Muscles that rise from the middle of the cubite to serue the thombe, are refreshed, it visiteth forthwith the wrist, whereas like vnto a trunke or stocke deuided into fine partes, so in like order this is sencered: i. wherof byustlyng into the forefinger, other two delite the thombe, the fist is sent to glitken the extreme part of the middle finger, as is sayd of others before. But from those whiche we sayd to go forward to the thombe, are extiled very small surcules, or twiggies, whiche yeld that benefite they may to the Muscle that is placed betwene the Thombe and forefinger. And truly great is the distribution of this fourth nerue beside among the Muscles of the cubite.

But the fist nerue is very small, of whose branches some are made out to yeld sense vnto the skinne of the shoulder and cubite: other branches it sendeth in like sort vnder the armpit: what remaineth associateth *Basilica Vena*, and in the same iourney disparteth diuersly surcules through the skinne, and at length endeth at the extreme partes of the hand. Whereouer this fist nerue certeine are sent vnder the *Camell* bone, to the viii. Muscle of the head, so to the first, and fourth of the bone *Tholles*, to the first, and second of the breast, and to the vi. of the shoulder; as also to those Muscles, that serue to draw the necke sidewayes. And this is the place whence small nerves are commundued to the fleshy *Scapula*, and so to the skinne of the necke. In this sort consider of the distribution of nerves vnto the hands, with as much perspicuitie as beaultie described. But note that in all persons you shall not finde the small surcules and twiggies of nerves alike dispersed, yet the bodies, stocks, and bowes of them you shall see in sundry bodies finally disagreeyng. But this is not to be marueiled at, if you espy in some bodies a Nerve that runneth through the middlest of a Muscle, and the same in an other to goe through the sides of the same. And so because in some that are wounded, some tyme feeling is lost, and yet the manner of mouyng remaineth still, and in others contrarily, as the mouyng lost, sense seafeth not, in others so both are destroyed together: Some Anatomistes (I say) in this case saymyng altonyed, and deuising to finde the cause, haue made differences in Nerves, that is to say, they will haue it that in every place where Nerves are distributed in the body, there should be both Nerves sensitive, and motie. But this opinion *Realdus Columbus* supposeth none to be of, saue such onely as are ignoraunt of the true distribution of nerves. And therfore that it is sufficient to say, that those surcules of sinewes that disperse abroad in the skinne, do byyng sense, (since the skinne moueth not) and such as are addicted to the Muscles, impart to them both feeling and mouyng. Wherefore when the Nerves of the skinne are wounded, or that noyfull matter segregated to those partes both corode or destroy them, it is no rare matter if the skinne in such places be left destitute of feeling: as also mouyng is marred, when in place of the Muscles where they are resident, solution of continuitie is made, with breach of the concurrence of the Nerves: And both are then maymed, when not onely in the Muscles, but also in the skinne, the sinewes be dispersed or deuided. Judge therfore in this wise the causes, when either sense or mouyng periseth, as also when both be destroyed together. If I shall speake playnly, a hurt that chaunceth vnto the Nerve before it enter into the Muscle, and in place where it should Retrahere, and Contrahere, cannot be any meanes contopne, or knitte together agayne. But if the like happen in that part whiche is already

Of the first payze of nerves to the hand.

Why in wounde persons sometime sense sometime mouyng, sometime both is lost.

Why by the hurting of a Nerve feeling or mouyng may be lost, when neither.

Wh. i.

entred

entred the Muscfe, in that parte shall neither continue amission of sense, nor mouyng.

If the fancie of any reasonable man, that labourerth with no lesse industrie to seeke the truth, shall perswade him to adde a sixth payze of Nerves to the handes, as heretofore it seemed good to *Vesalius*, let him beware, least in his indgement he deceiue him selfe, taking the deuision of some stocke, for the originall of some Nerve: in whiche absurditie many are welsted, whose names on earth resounde as echoes from the rockes, beyng in nothyng so farre deceiued as in the partes of mans body.

The Nerves of the brest, whiche are lesse then they of the hand, also haue their originall from the Spinnall merye, forth of the twelue Vertebres of the brest: howbeit they are not twelue payze, what soeuer moued *Vesalius* so to say, who not to haue espyed that to xij. Vertebres appertaine xi. holes, like as to xij. ribbes, xj. spaces, it is marueilous.

These twelue therfore of the brest, which issue forth at the common holes of the Vertebres of the brest, do not immediately constitute the fourme and manner of a net, as do the Nerves of the hand, but after their goyng forth, they all seuerally deuide them selues into two vnequall portions: for the payzes, in their distribution, some reach forth greater on the one side, the on then other, and some to the fore partes whereas their mates to the hinder partes are reflected.

Those that delite the fore partes, marche after the inferiour partes of the ribbes, after the cavitie in the lower part long wise engrauen: whiche in the History of Bones and description of the ribbes is more playnly set out, beyng couersaunt eche one in course, with a bzaunche of the veyne that is sayd to haue no mate, and of the great arterie. All which thre (I meane the nerue, veyne, and Arterie,) passing by one way, euen from the aforesayd Vertebres to *Os Sternon* after the length of the ribbes, and the Cartilages, vnder the succingent *Pleura*, or *Pleura*, like lynes equally and proportionably distanced, do enter among the Muscles *intercostales*, amongst whiche, both the outward and inward, they are ramified and spread.

Others are thought to bzyng sense to the sixth Muscfe of the brest, beyng placed in the inside of it, and do vynde together the forepartes thereof. From the aforesayd, Nerves flow through the first Muscfe of the shoulder, and through the second of the shoulder blade. Furthermoze other bzaunches are caried to the pappes, and their nipples or teates, brought from these nerves whiche in order follow: then more downward, from the nerves that are placed in the middle region of the brest, furcles are deriued, which are charged with the oblique descendent Muscles of Abdomen, in which place, of these nerves a large distribution is made. But from the last nerves of the brest are others departed, in which the fleshy part of the famous Muscfe *Diaphragma* is delited. The remnaunt of the Anteriour sinewes are commaunded both to the skinne of the brest and belly, sendyng also nerves among the Muscles, layed vnder *Esophagus*: as also to the rootes of the ribbes. Note further that with these nerves, the vj. coniugations of bzyng is interlaced and mingled.

The other diuision of the nerves of the brest is reflected towarde the hinder partes: and nerves from the aforesayd begotten, do carie sense to the first and second Muscles of the head, and to them of the necke: so in like sort to the fifth and sixth Muscfe, which circunuerse or turne about the shoulder, some makyng speede to the first and fourth of the shoulder blade: diuers direct them selues to the thyrde of the brest, and to the skinne about the shoulder blade, many visite the Muscles of the backe, makyng no lesse way to the fourth of the brest, and to the skinne of the backe beyng distributed.

But

Veril. cap. 15. Lib. 4.

Given stretch in nothyng so much as in the partes of mans body.

Of the Nerves produced fro the Vertebres of the brest. The Nerves of the brest are xi. payze. Veril. in error.

Diuision and distribution of the Nerves of the brest in generall.

But of this I would haue euery one that readeth the History of nerves to consider, that this Fibre like bzaunchyng of sinewes among the skinne partes, is in no wise to be accompted like in euery person: for to they be not in order, neither is any Anatomist able to decide perfectly in one speciall description, the crafty creepyng courses of the small twistes, or cutaneous furcles, to serue for all bodies: For asmuch as they can neither inuent the right order, nor certaine number, but in some more, in other some fewer, now also higher, and now more crooked. Thus seuerally iourneyng, and diuers is their distribution.

The paynfull Anatomist shall finde, that in coparison of the sinewes appertaining to the brest, these of the loynes are much greater. And although among fine Vertebres of the loynes, there is but foure common holes, yet fine sinewes are from them deriued, that is, as we haue sayd fine, payze or coniugations: For because the first payze goeth forth betweene the extreme Vertebre of the brest, and the first of the loynes, giuyng backe from the last ribbe, and is therfore rather nombred among the sinewes of the loynes, then of the brest. And that the more willingly since it denyeth his seruice to the brest, to yeld the same to the lower belly.

Wherfore now to speake bzielly of this first coniugation addited to the loynes, it creepeth forth at the common hole engratten betweene the twelfth Vertebre of the brest, & first of the loynes, whiche beyng of it selfe sufficient small, marcheth forwarde vnder *Peritoneum*. After the egress of goyng out thereof, it cleaueth into two bzaunches, whereof the one is greater, and the other lesser: the greater of them is caried to the fore partes, first preparyng nerves to the begynnyng of *Septum transversum*, whiche we haue sayd to arise from the bodies of the Vertebres of the loynes: Other sortes it sealeth not to proser to the endes of the first Muscfe of the thighe, called by his proper name *Lumbalis*, and many others to the Muscles of Abdomen. But the lesser nerue of this first coniugation, reflected towarde the hinder partes, endeth among the Muscles of the backe.

The second coniugation goeth forth betweene the first and second Vertebre of the loynes, marchyng vnder *Peritoneum*, and vnder the first Muscfe of the thighe, in whiche Muscfe many bzaunches also from this coniugation are spent. But rising vp at length, notwithstanding vnder *Peritoneum*, dispatcheth a bzaunche from the toppe of *Ilium*, whiche leapyng out of Abdomen, profereth both sense and mouyng to the first Muscles of the thighe, and to the first of the legge. But an other bzaunche it commaundeth to the first of the thighe; and first of the legge, and mountyng aboue the upper part of *Os Ilium*, to the skinne of the thighe. Besides all this, a very small sinew springeth from this same second payze, whiche beyng likewise very long, doth associate the seminarie vessels, and endeth at last in the Testicle. Whiche Nerve, some beyng greatly deceived, do call *Cremasteres*, for neither is this Nerve, nor the seminarie vessels to be called *Cremasteres*, but onely the fleshy Fibres placed in the coate of the Testicle called *Dartos*.

The thyrde payze of Nerves from the loynes goyng forth betweene the second and thyrde Vertebre, is caried vnder *Peritoneum*, and vnder the first Muscfe of the thighe. The first bzaunche from this payze decided, runneth vnder *Os pubis*, neare vnto *Os Ilium*: where it is into two deuided, the one part through the upper partes brought to the skinne of the knee, the other followeth the veyne *Saphena*. And what portio therof remaineth, is committed to the Muscles, and skinne clothynge the backe.

The fourth of these coniugations appeareth betweene the thyrde and fourth Vertebre, and beyng the greatest of all the nerves produced from the loynes, is wh. ij. caried

The entrance and distribution of nerves to the small partes.

Of the Nerves produced fro the Vertebres of the loynes. Wh. ij. there are b. payzes of nerves of the loynes and but in. ij. holes.

Of the first payze of Nerves of the loynes.

Of the second payze of Nerves of the loynes.

The error of some. What is *Cremasteres*.

The thyrde payze of Nerves of the loynes.

Of the fourth payze of Nerves of the loynes.

carried under the fifth Muscle of the thigh and *Os pubis*, and fellowly accompanieth a Veine & Arterie into the flanke: In which place it begetteth a sort of small surcles, which to the skinned and cutaneous partes of *Penis* and *Scrotum* are right seruiceable, but no deeper do they runne. Afterwardes in this region of the flanke it is deuided into seuen bzaunches, which are distributed to all the Anterior Muscles which shew their seruice partly to the legge, and partly to the thigh: Of which bzaunches, some likewise descend vnto the knee.

The rising of the fifth coniugation is in like sort betwene the fourth and fifth turning ioynt, which like vnto the rest is into two partes deuided: wherof the greater hath his passage vnder *Peritoneum*, towarde the fore partes, through the hole betwene *Os Coxendicis*, *Pubis*, and *Ilii*, whence after nerues are proferred to the ninth and tenth Muscles of the thigh, that turne it in compassed sort: Others thence straight to the seventh & eighth Muscle of the same thighe, to the Muscles of *Penis*, and to the bladder, and in women not onely to the bladder, but also to the matrice: notwithstanding the sinewes that resorte thereto from the vi. coniugation of the bzaune. And thus much of the first part of the fifth payze of the loynes. But the second part is reflected after the Muscles about the backe, and to the skinned, as is sayd by the iii. coniugation. And is this the brief description of those five payze of Nerues that appertaine to the loynes, which in going forth are connected and knitt together, the first with the second, the second with the third, the third with the fourth, & the fourth with the fifth, in order comparable to the implications of the sinewes of the arme.

And although the whole packe of the principall Anatomistes haue thus affirmed five payze of sinewes to the loynes, yet *Realdus Columbus* confesseth that not alwayes five payze are founde, but sometymes foure: for that in some persons (sayth he) the fourth with the fifth hath such communitie, that of them both but one payze can be described. Wherefore it anayleth not to meruaile why the grounded opinions of such famous men as haue sustayned great labour and traueil in the pilgrimage of mans body, should in tract of tyme founde so dissonant, since neither countrey, age, nor nature haue consented, that in the bodies of creatures should be no dissention. But now to come to the coniugations produced from *Os sacrum*, which may be called, and that worthely, the sinewes of the fete.

These sinewes therefore are founde to issue forth betwene the last Vertebres of the loynes, and the toppe of *Os sacrum*, and from the first, second, and third hole of *Os sacrum*. They are foure in number, which from their begynnings once gone, are so coniugned and knitt together, as worthely they may constitute the greatest nerue in the body, which, being esteemed no lesse, runneth in progresse vnder *Peritoneum* from the inner part of Abdomen, to the outer, towarde the haunches, and betwixt *Coxendix*, and *Coxix*, about that fourth Muscle that turneth about the thighe. After where it iourneyeth neare the greater Procelle trochanter, it sendeth forth nerues then, to the three Muscles springing from *Coxendix*, and that serue to bolue the legge. Others also to the blacke or leady coulored Muscle, growyng after the same sort from the greater trochanter: but here it ceaseth not, since afterward it casteth about through the hinder partes of the thighe, betwene the fourth and fifth Muscle of the legge, almost to the bought of the knee. In which place it is after deuided into two notable bzaunches or bolues, one somewhat greater then an other: whereof as the greater is excellently occupied among the hinder partes, so the lesser with as great celeritie, spredeth him towarde the forepart of the legge.

The greater agayne with sundry surcles from his body deriued, visiteth the bought of the knee, and the first Muscles to the outside of the fote appertaining.

But

But from the lesser it is easie to discern one litle one deriued, which searcheth the body of the Muscle vnder the hame, and an other that assaileth the third Muscle, whose begynnys is at the exterior head of the thigh.

But note by the way, that the greater body of this sinew after it hath passed the bought of the knee, is presently into other partes diuersly deuided: wherof one stretcheth forth vnder the two first Muscles of the fote, whose fleshy partes, when it hath passed, and ouergone, it creepeth along vnder the skinned, halting speedely after that sort to the hinder partes of the legge, not neglecting the extreme partes of the fote. From the other bzaunches, small surcles arise at the fourth, and greater Muscle of the legge, from thence to the interior and posterior partes of the legge, and keepeth his course vnder the inner ancle, so stretching vnder the sole of the fote, to augment his circuite, strappeth out to the very skinned, and to the first, second, and third extreme Muscle of the fote, then afterwardes to all other sortes of small Muscles, that in the sole of the fote retaine any seruiceable offices. Moreover, besides the sundry deuisions and distributions of this bzaunche rehearsed, it is after cut into ten portions of nerues, which by couples, that is to say, two to euery one, are commaunded to attend vpon the toes of the fete and their extremities, as also to yeld like bountie of their functions, to the skinned and cutaneous partes of the toes.

But an other bzaunche more deeply penetrateth betwene the greater and lesser Focile, cleauyng to the Ligament there intersited, which Ligament is sayd to deuide the anterior from the posterior Muscles, and ramifieth not obscurely amongest the first, first, and seventh Muscles of the fote. An other lesser trunkie is intertained among the fore partes of the legge, sliding vnder the Appendaunce of the lesser Focile, or *Fibula*, where it profereth nerues to the Muscles, as well from the greater, as the lesser Focile erected or sprung. The trunkie descendeth still downwardes, notwithstanding by the anterior partes of *Fibula*. Wherefore in this point we are admonished that in the application of a cauterie we pesserume not so farre as *Fibula*, but onely to the skinned or greater Focile, neither passe the depth of the first Muscle, for further, shall perishe the nerue last recited, after which ensueth most greivous accidentes, and payne in that place perpetually.

That portion of this nerue that remaineth, is carried vnder the Ligament, and fore part of the fote, pearcing vnder the extreme ancle, and through the extreme partes of the fote: out of which seate certaine surcles are sent to the xiiij. Muscles of the fote. Then after what remaineth, is separated into x. litle nerues, all which are notably inserted, and surely settled to the extremities of the toes. Yet this is not all: for from the same trunkie, one other small sinew is extended, least the extreme skinned partes of the fote, boyde of their company, should be frustrated of sensible proprietie. After the iij. holes in *Os sacrum*, follow the fourth, and in some the fifth.

But here before I intermeddle any further, you shall consider a reasonable cause, why the number of these nerues of *Os sacrum* be not certaine, since as it seemeth eche author writeth as he founde: which made some describe by others five, others foure &c. the cause I say is to be alledged in this point, like as in sundry other partes, the varietie of nature, and unlike construction of the bodies of creatures. Wherefore *Columbus* willingly declareth *Lib. 8. cap. 8.* that he hath found in diuers bodies *Os sacrum*, to consist of foure, of five, and of vi. bones, albeit neuer of three (sayth he) as Galen falsly affirmeth: howbeit I haue a scelerus to testifie the same at this day: so that whatsoener was then, it argueth *Columbus* was not of natures counsaile what she would do hereafter.

This note therefore, where *Os sacrum* hath five bones, there are foure holes, and where six, there five betwene bone and bone. Then in these two last holes

vij. iij.

are

A Cauter for the application of cauterie to the legge.

*Os sacrum* consisteth not alway of the number of bones. The author hath a scelerus where in *Os sacrum* consisteth onely of three bones.

Of the fifth coniugation of the loynes.

Howe these payzes of nerues of the loynes are connected and knitt together.

*Realdus Columbus* *Lib. 8. cap. 7.* The sinewes of the loynes are not alway five payzes.

Of the nerues of *Os sacrum*, & foute

Their beginning

The Nerue the greatest of all in the body.



are nourished and begon two other payre of sinewes, wantyng in those that lacke the v. and vi. bones. Which after they are egressed or gone forth, beget also, by together knyttynge, one notable nerue, which is naturally reflected and distributed amongst the Muscles of the haunches, and their skinne: also inwardly to the partes of Abdomen, as to the Muscles of the straight gutte, and of the bladder. So in some women to the matrice, and necke of the matrice, with like concourse of other surcles to *Scrotum* and *Perineum*. Likewise from the hinder partes of *Os sacrum*, through the same holes are departed other nerues, small, and thort, to the Muscles of the backe, haunches, and other posterioir partes of the skinne.

**G**low: but *Vesalius* denyng that, sayth that it may so happen that wherof *Os sacrum* both consist of fiue bones, there the end of the Spinnall marey styng out of the bone may constitute a surcle on eche side. *Collumbus* also not seemyng obstinately resistaunt in this matter, sayth, if any such be, it is to be imagined at the extreme part of the Spinnall marey: notwithstanding that in all his tyme, albeit very often, and for that onely purpose he protesteth to haue fought, he neuer found wherfoze to auouche the same. But sayth he, amongst all which hether to I haue dissected (almost innumerable) I haue sene the extreme part of the Spinnall marey in very many surcles, both to the right, and left side, distributed as also further dispersed through the fourth Muscle of the thighe, and throughout the skinne which is betwene the haunches, and euen downe to the fundamente.

So is manifestly argued vnto vs, how deuinely the incomprehensible creatoz hath made the body of mā, not onely simple to liue, but aptly to liue, with all requisite partes & parcels thereto. For as no part is destitute of naturall warmithe, tell me what member wateth the vitall and animall spirite: which as the first by the liuer and beynes, the secōd by the hart & arteries, so the thyrd by the bryayne & sinewes is transposed through all the partes. And if nerues be the instruments, of feelyng, & voluntarie mouyng, very inuiously seemeth *Vesalius* to deny some Muscles to haue them, since they are no Muscles that are without them, as testifieth *Realdus Collumbus* Cap. 8. Lib. 8.

¶ An end of the History of the Animall partes.

¶ Of the History of Man the ix. booke, discoursing the marey contained in the Bones, Periostion, and the heares.



**B**esides that in the History of the nutritiue partes are described the skinned and fatted, and amongst the Cartilages the nappes, there remaine yet certaine partes to be spoken of, which, in a solid discourse of the body of mā, may in no wise be omitted, as the marey cōteined within the bones, *Periostion*, & the heares.

The greatest Bones therfoze haue within them large capacities, whereby, together with their hardnes, they purchase lightenes and agilitie to moue. Notwithstanding such capacitie is not in them left empty, but with much marey is stuffed, which, flowyng thether from the common nourishment of the Bones by the small penetratynge beynes, is there made and repored, and by litle and litle in tract of them receiuyng preparation, both white, & concrease, till it become a substance fit to the nourishyng of the bones. Of which sort great store is found in the bones of the shoulders, armes, thighes, and legges. All other bones, in which are no such large cōcavities, but are either small, or lesse necessary vnto mouyng, do in small celles or pozie places conclude

a humoz more liquid the marey, and more thinnor melted, but which notwithstanding standyng answereth thereto in a certaine proportion. The bryayne and Spinnall marey haue an other manner of substance, as before in the descriptiō of the Spinnall marey is declared. And thus much of marey the proper nourishment of bones, is sufficient.

**P**eriostion is a sineloy Membran, & thinnor, which clotheth and entrapeth the Bones, & is endewed with much sence: wherfoze many are deceiued, through the ignorance of this Membran, supposing the bones to feele: for this Membran in the inside of the Scull do not feele. For there is no such thyng, although vnder *Pericranium* it may be found: neither are the teeth innested with *Periostium*. For what stode the teeth in neede of it: neither is it layd in the Articulation of bones: for so if it should be, it would excite meruailous paynes in the mouyng of the, as somewhat also we haue toucht before in the begynnyng of the History of bones.

The heares although they seeme superfluous partes I know not how, yet because they are as a certaine couering of our body, of them also a description is necessarily required. For besides that they couer the body, as we haue sayd, they serue also in the steebe of a propugnacle. Some do adde a thyrd vse of the heares, that is, that those fugitiuous vapours which are eleuated in the thyrd cōcōitiō of nourishment, whilst it passeth into the substance of the members, should be consumed into the nourishment of heares: which sentence *Collibus* neither prayseth nor disprayseth. But heares are made also (sayth he) for decencie of fourme. They spring forth of the skinne in perforatynge the same. The rootes of the heares are thicker then the other partes of them, and are fastened to the fat, which betwene the skinne and fleshy Membran is sitet, the purse of the *Testicles* excepted.

Wherfoze the heares take their nourishment from the fat and therfoze encrease. They grow almost in all places, but chiesly where the skinne is hoate and drye: for the cold & moyst is vnapt to the bringyng forth & containyng of heare. Where the skinne is hard and drye, as in the head and chinne, there is brought forth the longer & stiffer heare. The rootes of the nappes and heares are tender and soft: but that which is extant without the skinne, is strong and very hard.

In man the heares are begotten partly together, partly afterwarde. In the head they are naturally engendred, but properly in the evelyddes and brolves, which nature fro their first growth euer keepeth in alike greatnes, hauyng fixed them least they should encrease, into a most hard skinne like to a Cartilage: these are stretched and stable, not onely for comlynnes, but also to defend the eyes from moles, heares, and such outward accidentall annoyances. The heares which are after begotten first burst forth about *Os pubis*, & the fundamente, next in the armes, pities, and in men last of all in the chinne. In the sole of the fote and ball of the hand grow no heares, and that (say some) because of the broad Tendon: whiche the fote of the Hare hauing the same, and yet filled with heare, confuteth. But in deede those partes in man to be without heare, both vse and mouyng required: for in the Hare such hearynes furthereth her swiftnes.

Now here I will make an end, since all thynges seeme sufficient playnly expounded, whereby the meruailous woorkemanship, and subtill contexture of the members may be reuealed.

¶ An end of the ix. and last Booke of the History of Man.

Wh. iiii.

The Nerues of the hinder partes of *Os sacrum*.

Of the Nerue in *colligatus*.

Galen de Nerv. Dilect. No Muscles without one Nerue or more.

Fernel. Lib. r. cap. 15 Of the marey in bones.

How marey is engendred.

Where is the chief store of marrow.

What marey smaller bones containe & how.

The bryayne and Spinnall marey are of contrary substance to this. Col. Lib. 1. cap. 3. What is Periostion? It is a sineloy Membran which clotheth the Bones.

Periostion is not on the inside of the Scull.

The teeth are voyde of Periostium.

Why Periostium may not be in the teeth.

Col. Lib. 13. cap. 7. The vse of the heares.

The procreation of heares.

Whence the heares do spring.

Whence heares are nourished. Fernel. Lib. 1. huius corp. cap. 15. In what places heares growe most.

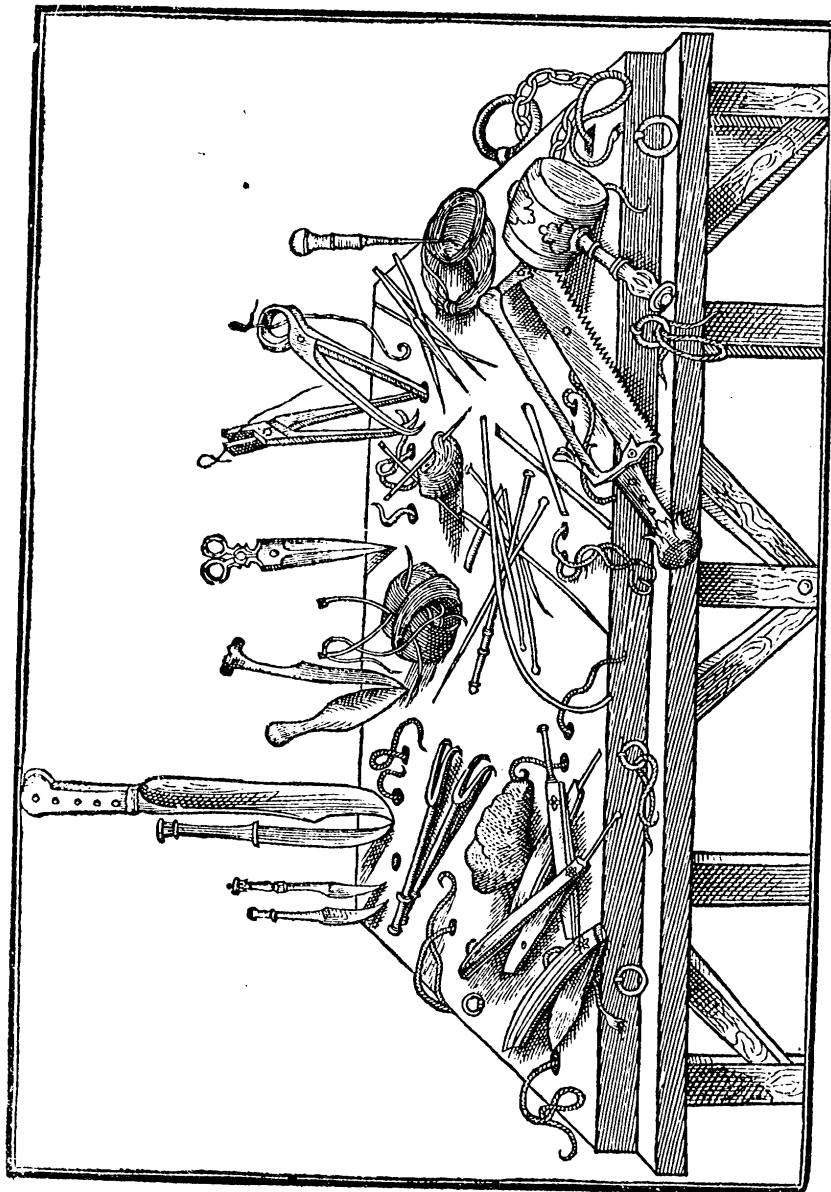
The heares grow not all at one time or from one begynnyng.

The vse of the heares of the eye liddes.

The opinion of some reposed in rebelyng a reason of the not hauyng heare in the ball of the hand and sole of the fote.

Col. loc. cit.

A Table of the Instrumentes seruyng to  
Anatomical dissection.



A Table wherein is quoted the place of euery Principall matter contained in this History, to be sought vnder the Letter Alphabetically, and to be founde by the direction of the Figure. Wherein the Reader is to be forewarned, that euery Prædicare is to be sought vnder his subiect, not els to be found in this Table: as to seeke the Appendances, Veynes, Nerues of the Teeth, he must looke vnder the name of Teeth, not of Veynes, Nerues or Appendances: and this order is obserued in all the other.

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